



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

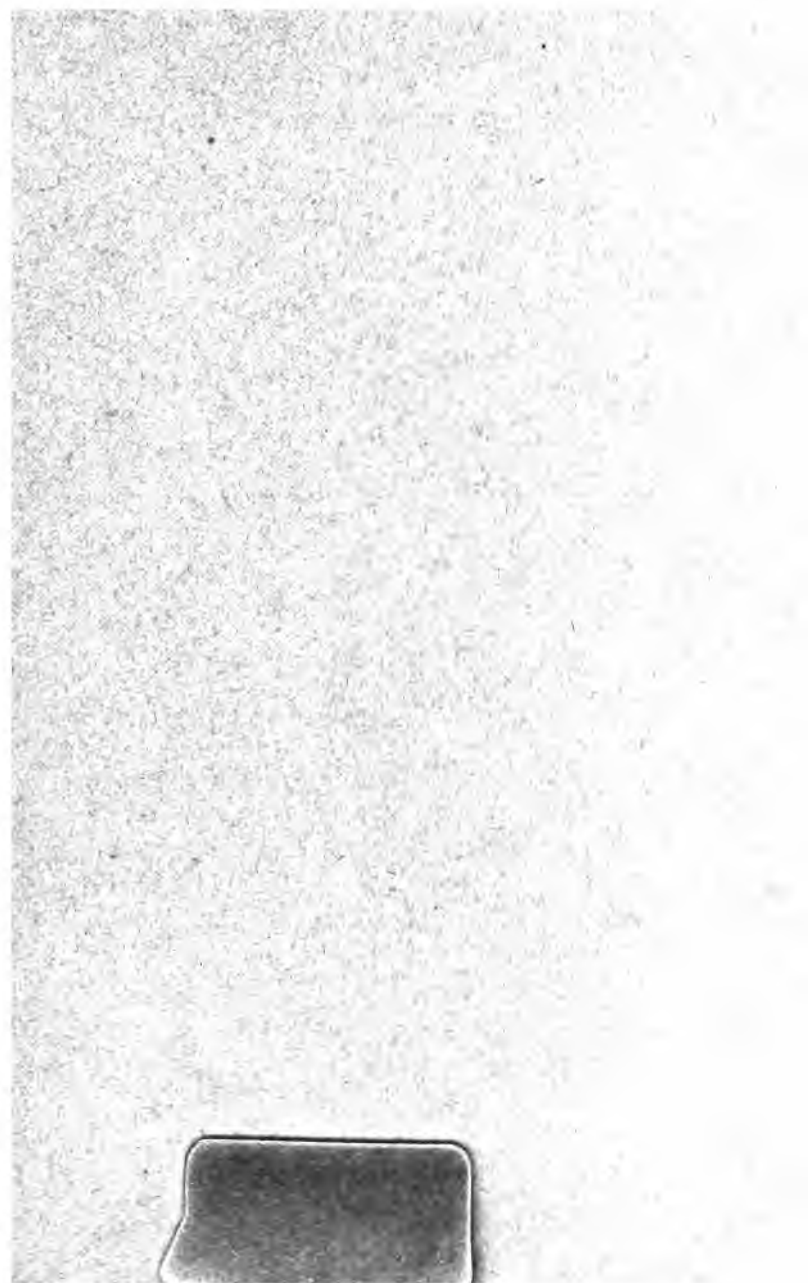
We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>

THE TONIC TREATMENT OF
EPILEPSY
—
TYRRELL









THE TONIC TREATMENT
OF
EPILEPSY



THE TONIC TREATMENT
OF
EPILEPSY
AND
KINDRED NERVOUS AFFECTIONS

BY
WALTER TYRRELL, M.R.C.S.



London
DAVID BOGUE, 3 ST. MARTIN'S PLACE
TRAFALGAR SQUARE, W.C.
1881

151. 0. 570.

Mr. TYRRELL *may be consulted personally at 30 Sackville Street, Piccadilly, W., every Thursday, between the hours of 10 and 1, and personally or by letter at Claremont, Great Malvern.*

PREFACE
TO THE
FOURTH EDITION.

IN laying before the Profession and the Public generally, this, the Fourth Edition of the Causes and Treatment of Epilepsy, I am hopeful that many may be led to adopt the plan which I have therein attempted to systematise, and to discard the present DEPRESSANT and PALLIATIVE plan of treatment in favour of a TONIC and CURATIVE one.

CLAREMONT, GREAT MALVERN,
May 2, 1881.


PREFACE
TO THE
THIRD EDITION.

THE Second Edition of this little work, published four years since, being now quite absorbed, it has become necessary to reprint it.

I take this opportunity of adding a few notes on the general treatment of Epilepsy, illustrating my remarks by a few of my more recent cases.

Engaged as I have been for twenty years in the study of the nature and treatment of Epilepsy, all my experience, later as well as earlier, would clearly tend to strengthen the opinion which I enunciated in the first publication of this little *brochure*, viz., That it is to Nervine Tonics, but especially to Strychnia, that we must look as the best remedial agents in the Treatment of Epilepsy.

30 SACKVILLE STREET,
PICCADILLY, W.



PREFACE
TO THE
SECOND EDITION.

IN announcing a Second Edition of this little work, it is satisfactory to be able to state that in its revision I find but very little to alter or erase, but much, in the report of successful cases, which might be added. As, however, this would involve a considerable increase in the size of the work, I have contented myself with the publication of some few cases, which, from the severity of their nature, and the length of time which had elapsed since their cure, cannot fail to commend the plan of treatment, both to the profession and the public.

CLAREMONT, GREAT MALVERN,
March 1874.



CONTENTS

CHAPTER I.

	PAGE
EPILEPSY PURELY A NERVOUS DISORDER, AND ALL THE VASCULAR AND OTHER PHENOMENA WHICH OCCUR DURING THE SEIZURE ARE CONSEQUENCES, AND NOT CAUSES, OF THE ATTACK	I

CHAPTER II.

THE SEAT FROM WHICH AN EPILEPTIC CONVUL- SION IMMEDIATELY TAKES ITS DEPARTURE IS THE MEDULLA OBLONGATA	7
--	---

CHAPTER III.

OTHER NERVOUS DISORDERS, MORE ESPECIALLY HYSTERIA, ARE CLOSELY ALLIED TO EPILEPSY —CASES IN ILLUSTRATION	29
--	----

CHAPTER IV.

	PAGE
THE PREDISPOSING CAUSES OF EPILEPSY ARE TWOFOLD—FIRST AND MOST IMPORTANT: A DEFICIENT POWER OF CONTROL AND REGULA- TION OF NERVOUS FORCE. SECOND, AN EXCITED AND HYPERSENSITIVE CONDITION OF THE NERVE CENTRES OF THE MEDULLA OBLONGATA	36

CHAPTER V.

EXCITING CAUSES OF EPILEPSY—TABLES OF STATISTICS	42
---	----

CHAPTER VI.

TREATMENT OF FIRST PREDISPOSING CAUSE .	54
---	----

CHAPTER VII.

TREATMENT OF SECOND PREDISPOSING CAUSE .	62
--	----

CHAPTER VIII.

USE AND ACTION OF STRYCHNIA	69
-----------------------------	----

CHAPTER IX.

CASES	82
-----------------	----

EPILEPSY.

CHAPTER I.

EPILEPSY PURELY A NERVOUS DISORDER, AND ALL THE VASCULAR
AND OTHER PHENOMENA WHICH OCCUR DURING THE SEIZURE
ARE CONSEQUENCES, AND NOT CAUSES, OF THE ATTACK.

ALMOST all writers upon the origin and cause of convulsive disease, epilepsy especially, have, I think, overlooked or at any rate underestimated the influence of the nervous circulation as distinguished from the circulation of blood, and have endeavoured to find in the latter, causes which really arise from the derangements of the former.

Most writers
underrate
the import-
ance of ner-
vous circula-
tion.

Thus, even Marshall Hall, accurate observer as he was, came to regard venous congestion as the immediate forerunner of the epileptic seizure, and clearly mistook effect for cause. For, as Van der Kolk points out, the convulsion begins to decline in violence at the very time when the venous congestion is at its height. Again, it is evident that the contraction of the platysma and other muscles of the neck, which Marshall Hall rightly

Marshall
Hall's theory
of venous
congestion as
causative of
the convul-
sion.

regarded as the cause of the venous plethora, clearly has its origin in nervous spasm.

Solly's
theory of
arterial con-
gestion.

Solly, again, who regarded convulsion as the effect of excessive arterial supply, was equally wide of the mark. No doubt can exist that in the majority of cases of epilepsy one of the first phenomena which result from the irregular discharge of nerve-power is the occurrence of a vasomotor contraction, thus producing the exactly opposite condition, an anæmia, not an arterial congestion. This is plainly shown by the sudden pallor, often amounting to lividity, which shows itself in the countenance during the early moments of a paroxysm. No doubt the capillary vessels supplying the sensitive nerve centres of the medulla oblongata are found in old-standing cases to be frequently more or less enlarged, but this is a consequence, not a cause, of the seizures.

Capillary
dilatation is
found post
mortem, but
only as an
effect.

Facts
opposed to
the theory of
arterial con-
gestion.

The arterial congestion theory would also appear to be contradicted by the fact that epileptic seizures are very apt to occur during sleep, which is supposed by most physiologists to coincide with an anæmic condition of brain, though this is doubted by some.¹ If further evidence were required to contradict this theory, it is afforded by the totally different class of symptoms which are known to result from arterial congestion of the cerebrum, viz. delirium more or less

¹ Michael Foster, p. 639.

violent, followed by syncope, if the congestion become extreme.

Of the exactly opposite theory, viz. that convulsion is caused by an anæmia of brain, there are numberless supporters. Kussmaal and Tenner

Theory of cerebral anæmia as cause of epilepsy.

(whose experiments I shall refer to presently) considered it proved by their experiments upon animals. Dr. Watson following them, and quoting Dr. George Johnson, is also in favour of this theory; Van der Kolk also considered the vasomotor contraction, and consequent anæmia of brain, to be the cause of the unconsciousness in an epileptic seizure. It is, I think, evident that

Facts opposed to anæmic theory.

he was mistaken, for the loss of consciousness is altogether too sudden to be the result of any change in the vascular circulation, or indeed of anything but a nervous shock. Again, what would appear to be conclusive, is the fact that in many cases of pure epilepsy (*le petit mal*) an entire loss of consciousness is unattended with any change of colour. Again, if the supply of blood be suddenly cut off, as for instance in syncope, the patient cannot maintain the upright position, while in certain forms of epilepsy the patient may continue to stand, or even walk. In syncope, however, the loss of consciousness is seldom so sudden or so complete as in epilepsy. The fact that an attack often occurs during the first few minutes of sleep, which, as I have just stated, is supposed to

Comparison between syncope and epilepsy.

coincide with a state of cerebral anæmia, would seem at first sight to strengthen this (anæmic) theory. Yet even during the less complete anæmia of sleep—it must be less complete, as it is unaccompanied by any change of colour—we find, as before, that the upright position cannot be maintained, the head will fall over to one side, even when a person falls asleep in a sitting posture. Yet in certain cases of the minor form of epilepsy (rare ones, it is true) the patients will continue to maintain muscular action. There is considerable difference of opinion among authors as to this point. Dr. Russell Reynolds sums up by saying, “There appears, then, no reason for doubting that the immediate cause of loss of consciousness is arrest of the cerebral circulation, owing to contraction of the vessels, through irritation propagated along the vasomotor nerves from the medulla oblongata.” It may be objected to this that loss of consciousness is not the only phenomenon present in an epileptic seizure, and that it is only this one feature for which Dr. Russell Reynolds is endeavouring to account. I answer to this that not only is the loss of consciousness not caused by the anæmia of brain brought on by the vasomotor contraction, as proved by the facts just stated, but also, as there are cases of pure epilepsy in which loss of consciousness is the sole symptom, unattended by loss of colour, or failure of muscular

Dr. Russell
Reynolds
supports
anæmic
theory.

control, that therefore the epileptic seizure must have its origin solely in a change of nervous condition. Dr. Bristowe,¹ on the other hand, in his work on the practice of medicine, says, "There is therefore reason to believe that the epileptic fit commences before the brain becomes anæmic," and I think that the facts which I have adduced are sufficient to show that he is right, and that the first phenomena which we notice in epilepsy are entirely due to sudden nervous discharge, but no doubt the outward and visible nature of the phenomena has withdrawn attention from the real cause of the convulsion, just as in the ordinary changes of countenance, the results of emotion, take for instance the effects produced by sudden shocks of joy or fear, we are apt to overlook the unseen change which precedes the vascular and apparent one. It is only by considerations and comparisons of this kind that we can arrive at a clear understanding of the phenomena which we witness in an attack of epilepsy, and determine the order in which they occur.

Dr. Bristowe
opposed to
anæmic
theory.

Epileptic
attack due to
sudden ner-
vous dis-
charge.

That variations in the circulation of the brain and medulla oblongata may and do act as *exciting* causes of epilepsy, I quite admit ; for, as constantly happens, if the quantity or quality of the blood be rapidly altered, changes may occur in the nervous system which will end in

Variations in
the circula-
tion of blood
may act as
exciting
causes.

¹ Bristowe on the *Practice of Medicine*, p. 1070.

convulsion ; but in no case can these derangements of circulation act otherwise than as exciting causes.

Epilepsy
purely a
nervous
disorder.

It is then, I think, demonstrable that epilepsy is a disease which has its seat solely in the nervous system, that it is due to certain conditions of the nervous system which may be hereditary or induced, but which, when they exist, may be brought into action by the application of causes of irritation outside and independent of the nervous system. I think that it is to be further demonstrated that the portion of the nervous mechanism from which the epileptic and indeed all convulsion takes its departure is the medulla oblongata. And this proposition I shall now hope to prove.

CHAPTER II.

THE SEAT FROM WHICH AN EPILEPTIC CONVULSION IMMEDIATELY TAKES ITS DEPARTURE IS THE MEDULLA OBLONGATA.

BEFORE proceeding farther, it will be necessary to enter more into the nature of epilepsy, and to specify to some extent its nature and varieties.


Epilepsy is a disease of a paroxysmal nature, caused by the sudden escape or discharge of an accumulation of nerve force from the nerve centres of the medulla oblongata. This discharge may take place with more or less suddenness, and is in some cases heralded by nervous sensations of various kinds, and of different degrees of intensity. In many cases, however, the attack is instantaneous, the patient falling in a moment, and without the slightest warning.

Although it is in many cases difficult, as I shall presently show, to distinguish pure epilepsy from its kindred nervous affections, hysteria more especially, yet I think that it may be taken as a rule that every case of pure epilepsy is attended with

complete unconsciousness. No doubt certain cases may arise in which even this symptom may be simulated, but I think these are usually not difficult to detect.

In describing epilepsy, I prefer to adopt the usual method of classification, and divide the disease into the two forms, convulsive and non-convulsive, *le haut mal* and *le petit mal*. Convulsive epilepsy may be complete or partial, that is to say that the nerve force discharged from the nerve centres of the medulla oblongata may find its way down all the motor tracts, thus producing a universal convulsion, or it may pass down only one or two efferent nerves, and so produce a local or partial convulsion. It will generally be found that in the commencement of a convulsive seizure, one side of the body is more drawn than the other; very commonly the head is twisted over to one side,—this is due to the greater muscular development on one side than on the other; the hands are firmly clenched, and the thumbs are drawn tightly inwards towards the palms. An attack of this nature (*le haut mal*) may commence in one of many ways, and may or may not be preceded by a change of colour in the face, but if such a change do not take place early in the course of the paroxysm, it is sure to come on sooner or later,—usually first a pallor passing into lividity, followed by a deep congestion and

engorgement of the whole head and neck, from the obstruction to the venous circulation ; during the progress of the seizure the heart's action is found to become tumultuous and irregular, and the pulse also is much disturbed ; the eyeballs are distorted, being usually turned upwards ; the tongue is in many cases pushed forward between the teeth, and torn and lacerated by the convulsive grinding of the jaws ; the difficulty of respiration, owing to the fixing and spasm of the muscles of the chest, is often great ; and after a time the supply of nerve force which has to pass off becomes exhausted and the muscular spasm ceases, the patient gives a deep inspiration, and the congestion of the face and head begins to diminish. However, clonic irregular spasms will occur at intervals. After the attack the patient usually sinks into a deep stertorous sleep. Such is the description of an ordinary attack of convulsive epilepsy. The lesser form of seizure usually consists in a temporary loss of consciousness only ; this may be so momentary as to be almost overlooked by the patient ; in childhood especially it is apt to be passed over as a matter of no consequence. In a case now under my care, and which has since developed into severe epilepsy, the patient perfectly remembers suffering from these slight attacks as a child, but he then took but little notice of them, but termed them "seeming hours." The patients affected with this form of the disorder



rarely fall, though they may, if standing, stagger, or support themselves against some neighbouring object; but in a case which I shall presently describe, the power of walking remains perfectly during the whole period of unconsciousness. Patients unaware of the importance of these attacks are apt to call them by terms of their own invention. I have heard them described as "feelings," "turns," "sensations." In some cases the lesser form of epilepsy may alternate with the convulsive form of seizure, or the one may pass into the other, as I have often seen. It is difficult to say precisely why these two forms of attack should exist, and which are the different conditions which produce such entirely distinct symptoms. I imagine the fact to be that in the lesser form of seizure the wave of nerve power liberated from the medulla oblongata passes only upwards through the cerebrum, thus producing unconsciousness, but no convulsion. Of course this would demand the expenditure of a much smaller amount of nerve force, which may account for the much greater frequency of such seizures. It would also explain the extremely prostrating mental effect which such discharges produce. Indeed the mental condition after such attacks is often most perplexing. As patients will do all kinds of extraordinary things while thus distraught, and are frequently very obstinate and difficult to manage when this is the

case, it is most important that they should be in the hands of a careful attendant, or very distressing results are apt to occur. These slighter attacks vary very much in the phenomena by which they are attended. They may or may not be accompanied by slight twitching of some of the facial muscles, and the patient may or may not change colour, though in most cases there is a sudden pallor followed by a deep flush ; in many cases the loss of consciousness is immediately preceded by an exclamation or an indistinct muttering ; in others there is no sound whatsoever ; in most cases the eyeball is fixed, and the eyes stare with a vacant look straight forward. In my experience attacks of this nature are more frequent among women, and are more apt to occur at the catamenial epoch. In two cases now under my care the seizures commence directly after the menstrual period, and continue usually for a week or ten days, when they suddenly cease, to reappear again at the next period.

With regard to the immediate treatment of the epileptic paroxysm, but little need be said ; beyond protecting the patient from injuring himself, and taking care that the throat and chest are freed from the tightness of clothes, so that respiration is as little impeded as possible, but little can be done ; it is, however, of great importance that the sleep, which almost invariably follows the seizure,

should be left as much as possible undisturbed, the patient being placed on a bed, and the room darkened. By these measures the brain and nervous system are allowed to recover from the strain to which they have been subjected. It is a manifestly good sign when a patient recovers from the consecutive stupor more readily, and when the mental clearing is more rapid, and these results will generally be the first recognisable effects of a tonic plan of treatment. I shall describe under the head of Treatment of Epilepsy all the medicinal and general routine to be followed in the treatment of epilepsy in its interparoxysmal periods; but much might be written, and still more carried out to advantage, with regard to the treatment of epilepsy from a psychological point of view. All epileptics are remarkably amenable to mental influence, and the surroundings and associations of persons then suffering should be carefully studied. As a rule, the tendency of their mind in such cases is to a steady deterioration. There are cases, rare ones, it is true, in which the discharge of nerve force, instead of being general and passing off through the whole system of motor tracks, is limited to one nerve. An excellent example of this local form of the disorder is at present under my care. A boy, in whom there exists a strong hereditary tendency to epilepsy, is seized periodically, more especially after any nervous exhaustion, such as

over-fatigue or over-excitement ; but attacks which are clearly traceable to a discharge of nerve force down the track of the pneumogastric nerve, as all the symptoms produced take place in organs supplied by that nerve, and in them the greatest irritation is manifested. In such cases the actual origin of the paroxysm is frequently overlooked, or the malady is referred to other causes. In these cases there is always great danger lest the neurosis should lose its partial character and become general. In the case I have above mentioned, the patient has been much benefited by strychnia and a general tonic course of treatment. Such cases of local disturbance it is difficult to account for on physiological grounds. We must, I think, suppose that in such cases the irritation or hypersensitiveness is limited to one nerve centre only ; and that the discharge takes place from that without affecting the rest of the group.

Many physicians are inclined to connect peculiarities in the shape of the head and malformations, such as irregularities in the two sides, or a twist of the calvarium, with epilepsy. I think there can be no doubt that in such patients we do meet with neurosis of various kinds ; but I do not think that we must look particularly for epilepsy in such cases.

The medulla oblongata is that central spot of the nervous system, the *nodus vita*, as it has been

Medulla oblongata, seat in which motor power becomes bilateral.

termed, in which motor power becomes bilateral. In the spinal cord below, divided as it is into two lateral portions, between which there is no decussation of the motor nerve, and in the cerebrum above, in which most functions would appear to be unilateral, an injury of one side produces a merely unilateral effect, and it is only through the medium of the medulla oblongata that a bilateral combination is produced. It is very well shown by an experiment of Brown-Sequard's. That observer divided one half of the spinal cord in dogs opposite to the lower dorsal vertebræ ; this produced, after three weeks, convulsions which affected both sides of the body, which convulsions could be at any time brought on by irritating the medulla oblongata through the nervus trigeminus of the same side. Thus, if the cord was divided on the left, irritation of the left cheek produced the attacks ; if both sides of the cord were divided, irritation of either cheek would induce them. We must infer from this that the sense of irritation travelled slowly up the cord to the medulla oblongata ; indeed the convulsions could be induced only by irritation of a nerve springing directly from that spot. I have long observed that in epileptic patients a peculiar sensitiveness exists in the neighbourhood of the medulla oblongata. I frequently find that by applying pressure over the space between the occiput and the atlas

d's
sent.

re-
er
ita in
cs.

peculiar sensations are apt to arise. These sensations are liable to be referred either to the stomach, throat, or some point which derives its nervous supply directly from the medulla oblongata, and are apt to assume a similarity to sensations which would ordinarily precede an attack ; indeed, in several cases I have been enabled by pressure over this space to intensify all these nervous sensations almost to the verge of an actual seizure. If the earlier phenomena of an epileptic seizure be watched carefully, it will be found that they all arise in parts which are immediately in connection with the nerve centres of the medulla oblongata. Thus the first symptom may be the peculiar cry caused by the sudden closure of the glottis, or, again, the sudden spasm discharged from the vasomotor centre may cause a sudden pallor to come over the countenance. Again, as Van der Kolk¹ remarks, the first disordered action may manifest itself in difficulty of respiration. In several cases I have noticed that the attack commenced by a sudden choking while swallowing food. Joseph Franck observed that in seven out of twenty-one patients treated at Wilma, vomiting was the first noticeable symptom. Now, in all these cases, which are examples of the most common commencement of epileptic attacks, the parts implicated in producing the phenomena are all in the most intimate relation with the nerve

First symptoms of attack arise in parts closely related to the nerve centres of the medulla oblongata.

¹ Van der Kolk, p. 210.

centres of the medulla oblongata. On the other hand, in cases of epilepsy in which the source of irritation or exciting cause is situated at a distance from these sensitive nervous centres, and also in those cases which commence with an aura, the convulsions do not become general, nor do any head symptoms occur until the irritation has reached these important nerve centres. The experiments of MM. Kussmaal and Tenner, although they misled them into forming an incorrect theory as to the immediate cause of convulsions, afford a strong proof that the medulla oblongata is the seat from which these convulsions spring. These observers first excited convulsions in rabbits by cutting the supply of arterial blood to the brain and medulla oblongata; they then removed the cerebrum even as far as the crura, and in one or two cases the cerebellum itself was sliced off; yet notwithstanding this mutilation, the convulsions still continued. These very crucial experiments would certainly seem to place the seat of epilepsy below the cerebrum proper. Again, if the supply of blood to the spinal cord were cut off by applying a ligature to the arch of the aorta, no convulsions but paralysis ensued; but when the aorta was tied and compression of the vessels made, thus cutting off the supply of blood to the cerebellum and spinal cord, convulsions came on immediately, thus we must infer that the source of general

Kussmaal
and Tenner's
experiments.

convulsion must be sought for within the cranium ; yet convulsions continuing after the cerebrum and cerebellum were removed would plainly limit the seat to the sensitive parts lying at the base and closely connected with the medulla oblongata, those parts indeed, which Marshall Hall grouped together under the name of medulla oblongata. In many cases of epilepsy, especially in children, there is a remarkably free flow of saliva, a fact which would point to an exalted sensibility of the centre for excitation of the secretion of the saliva which is situated in the medulla oblongata. The protrusion of the tongue, again, although it is not always one of the earlier phenomena of an attack, is an action too closely connected with an irritation of the medulla oblongata to be passed by without remark.

Source of general convulsions within the cranium.

Free flow of saliva points to medulla oblongata.

Protrusion of tongue.

If we now proceed to compare these facts with others which are to be gathered from the results of post-mortem examination, we shall, I think, find remarkable confirmation of the views I have expressed. The seat and causes of epilepsy have been so little understood that many otherwise accurate observers have altogether failed to detect after death any deviation from the normal condition. Foville, indeed, in speaking of the post-mortem examination of the epileptic, says, " Vous en trouverez rien, absolument rien qui diffère de l'état normal dans le plus grand nombre des cas de ce genre." It was partly owing to the dicta

Foville.

Dr. Boyd's
post
mortems.

Van der
Kolk's
theory.

Van der
Kolk's
theory. En-
largement of
capillary
vessels of
medulla
oblongata.

of men like Foville, partly, no doubt, to the want of accurate observation of pathological changes in the dead body, and perhaps, most of all, to the want of microscopical aid, that so little was discovered until late years of the true nature of the changes produced by epilepsy. For instance, Dr. Boyd, who gave the results of the post-mortem examinations of fifteen epileptics, seems to have paid more attention to the thickness of the skull, and the weight and general appearance of the brain, than to any minute examination of its tissues—indeed, it is not clear that in any case he examined the medulla oblongata at all—yet these reports were published so late as 1857. It is to Van der Kolk of Utrecht, no doubt, that the credit is due of having first pointed out that deviations from the normal structure are to be detected post mortem in the nerve centres of the medulla oblongata of the epileptic. He first noticed that the sensitive parts at the base of the brain became hardened, owing to the deposition of albuminous matter in its tissues through exudation from the vessels. This led him to a closer examination of the capillary system of the medulla generally, and he found that in the epileptic of long standing these vessels were invariably more or less enlarged. So accurately were his investigations carried out, that he was able to foretell, with a considerable amount of certainty, whether a patient had during the attack

been liable to bite his tongue or no, by observing whether the capillaries which supply the hypoglossal centres in the medulla oblongata were or were not dilated.

It would be useless to follow up the reports of other investigators beyond saying that M. Ferrus observed increased density of the brain, a condition probably akin to the hardening produced by albuminous deposits as observed by Van der Kolk, and so far a corroboration of the truth of his examination. Wenzel, again, considered that disease of the pituitary body was the real "causa mali" in epilepsy, and quoted a number of cases in which it was found to be affected in persons who had thus suffered. In this, however, he was refuted by Rokitansky, who says, "I have frequently failed to discover this disease (of the pituitary body) in those who had notoriously suffered from epilepsy and convulsions." No doubt but that disease and disorganisation of other parts of the brain may and do act as exciting causes of epilepsy, but they can, I think, do so only through the medulla oblongata. To the above opinion of Van der Kolk's I may add that of Dr. Russell Reynolds, who regards the medulla oblongata and the upper part of the cord as the primary seat of epilepsy. I may also quote the opinions of MM. Luys and Voisin, who, as the result of very careful post-mortem investigations, conclude that "the parts

M. Ferrus observed increased density of brain.

Wenzel's theory of disease of pituitary body as cause of epilepsy.

Opinion of Dr. R. Reynolds.

which mainly suffer in this affection are the medulla oblongata, corpora striata, the cerebellum, and other parts at the base of the brain.”¹

Epilepsy a disease which, in the intervals of attack, shows but slight departure from health.

This is, of course, giving a large base of operation, but it must be remembered that there were great difficulties in the path of observers, and that in a disease which has its origin, as I believe, in the derangements in the circulation of an unseen and impalpable force, a disease which in its inter-paroxysmal periods gives but slight sign of its existence, we can expect to find but few structural changes, and these only in old-standing cases.

Seat of convulsion is in nerve centres of medulla oblongata.

I think the facts which I have brought forward afford strong evidence that the seat of convulsion is situate in the important nerve centres of the medulla oblongata. Now if this portion of my theory be granted, it now remains to discover what is the condition of these centres previous to an attack; and further, to inquire into the causes of the seizure, proximate and remote.

Comparison between an epileptic seizure and the discharge of a Leyden jar.

An epileptic attack presents many points, among which I may mention the instantaneous and complete nature of the seizure, which lead one by a natural inference to compare the phenomena of convulsion with the discharge of a Leyden jar; and I think there can be no doubt that a somewhat similar process does take place, viz. a sudden explosion or escape of nerve power. It is evident from

¹ Bristowe, p. 1069.

Van der Kolk's observations, as well as from numerous symptoms which precede the actual convulsion, and which in themselves strongly corroborate his discoveries, that the nerve centres of the medulla oblongata in persons suffering from or liable to epileptic convulsions, acquire a too active supply of nerve force, in consequence, it may be, of increased arterial supply, or simply from a determination towards them of nerve force, to the depreciation of the rest of the body, in fact that a nervous congestion occurs. I use this term congestion advisedly, for I see no reason why such should not occur, precisely in the same way that a corresponding vascular congestion takes place in consequence of derangement of the blood circulation. Many facts which I have observed in actual practice strongly support this view. Generally speaking, an epileptic develops greater energy previous to an attack. He expresses himself as feeling better than usual, and more full of vitality. "His bosom's lord sits lightly on his throne." He is apt to become excited, and in many cases irritable,—in fact we see in different cases different developments of disposition, just as we do when the cerebrum is excited by alcohol. Bon vin ou mauvais vin. In some cases indeed there is distinct hallucination and disturbance of the nerves of special sense, and these exalted conditions are almost always to be connected with an over-

Too active supply of nerve power to nerve centres of medulla oblongata in epilepsy.

Epileptics generally more full of vitality previous to a seizure.

Increased activity and excitement of nerves of special sense previous to attack.

- stimulation of the nerve centres in which these nerves originate, coupled possibly with an excessive arterial supply. Thus, in one case which came under my notice some years since, an attack of epilepsy was always preceded by a foul smell in the nose, coming on sometimes two or three days previous to the actual seizure. In a second case a distinct hallucination of sight occurred, the patient seeing objects surrounded by a bright halo of light for some time previous to an attack. Thus, on one occasion, I remember that he saw a dog with such a light around it. In a case which is now under my care, flashes of light, followed by brilliant revolving lights and colours, often precede an attack by some minutes.
- Case I.
- Case II.
- Case III.

Increase of
heat of head
and neck
previous to
attack.

- In many cases also, there is a distinct increase of the heat of the head and neck. In a case mentioned by Van der Kolk, there was a difference of 13° F. between the heat of the head and that of the cheek of a patient immediately prior to a severe epileptic seizure; and in a case I have now under treatment, in which the epilepsy followed a severe injury to the head by a fall from a horse, which left a considerable cicatrix at the lower part of the frontal bone, a marked redness and increase of vascularity in the cicatrix was always observed to precede a seizure.
- Case IV.

Analogy
between
epileptic and
electric dis-
charges.

Another fact which seems to help out the analogy between epileptic and electric discharges is the manner in which a second discharge occurs

when the first has been insufficient to exhaust the accumulated nerve force ; but when once this is exhausted the patient will experience an immunity from attack until the jar is again charged. To this may also be traced the fact that in *petit mal* or non-convulsive epilepsy, in which the wave of discharge is much slighter, and passes off only through the cerebrum, the attacks are usually much more frequent, forty and fifty, or even more, sometimes occurring in one day.

Petit mal attacks more frequent because so much less violent.

The nature of the processes which are continually going on between the nerve cells of the various ganglia, are but little understood. It is impossible to surmise what form of action passes between these cells whenever a simple reflex action, such as the transference of a sensory impression received from an afferent nerve, has to be converted into a motor influence and conveyed down a motor tract to a muscle. It is therefore, as might be expected, difficult to say positively what changes the nerve centres of the medulla oblongata, structures of most delicate and sensitive organisation, undergo, to render them liable to suddenly discharge their force. In all probability there is, as I have stated above, a too active determination of nerve power to these parts, coupled with an excited and hypersensitive condition ; and this is probably intensified by the increased flow of arterial blood to the same parts ; but

Processes which go on between nerve cells are but little understood.

Impossible therefore to say what changes precede epilepsy in nerve centres of medulla oblongata.

Want of
power of
control of
nervous
system the
real cause of
epilepsy.

these causes would, in themselves, I think, be insufficient to cause a discharge from the cells were it not for a defect of which I am now about to speak, and which defect, in my opinion, constitutes the main predisposing cause of epilepsy.

Michael
Foster on
inhibitive
control.

That the whole nervous system in man is subordinated, regulated, and controlled by some power within him is evident, otherwise all the natural functions of the body, all power of combined and co-ordinate movement, would be at an end. Of this power, and of the manner in which it acts, we have but slight knowledge. As Michael Foster,¹ in summing up his remarks on the function of the spinal cord, says, "These various facts plainly show that the spinal cord, and indeed the whole cerebral nervous system, may be regarded as an intricate mechanism, in which the direct effects of stimulation or automatic activity are modified and governed by the checks of inhibitory influences ; but we have as yet much to learn before we can speak with certainty as to the exact manner in which inhibition is brought about."

Inhibitive
power in
respiration.

Even in those vital actions which appear to us at first sight to be almost entirely automatic, we shall find that this controlling or inhibitory power has influence to a greater or less extent. Respiration, for instance, is partially under control of

¹ Michael Foster, *Physiology*, p. 541.

this power. The heart's action may be checked by impulses proceeding from the brain, and aroused by emotional causes, as in cases of syncope from terror, and in some instances by an effort of will ; and all organic functions will be found to be under this regulating influence to a greater or less extent. And as we descend in the scale to the less important functions, we shall find the inhibitory restraint to be greater. Michael Foster, indeed, says, " Seeing that in the ordinary actions of life the spinal cord is to a large extent a mere instrument of the cerebral hemispheres " ; and if we examine the functions of organs which derive their power by reflection from the nerve centres of the spinal cord, we shall see the truth of his remark. Take, for instance, the action of the lower bowel in defæcation ; of the bladder in micturition ; of the erectile power of the penis—all reflex actions, yet to a vast extent subordinate to cerebral control.

Inhibitive power in cardiac action.

Michael Foster on spinal cord.

Reflex actions centred in spinal cord under inhibitive influence.

Familiar examples of the more simple forms of inhibitory power are not wanting : take, for instance, the power of preventing the jerking of the legs when the feet are tickled, and of refraining from uttering cries when undergoing pain, the arrest by the exercise of this power of hiccough or cough. In perfect health, no doubt, the supply of nerve force to each part of the body is duly regulated, any excess is checked, and any deficiency supplied, and

Familiar examples of inhibitive power.

In health a power exists which regulates distribution of nervous force.

This force extends its power to the cerebrum.

by this means only can any organ be kept in active working order, and ready at each moment to obey the dictates of the will or the summons of reflex stimuli. Nor is this regulating or inhibitive power confined merely to the superintendence of physical action ; it extends also over those which are distinctly cerebral : thus it keeps in check and moderates mental emotion, and by thus doing, produces a marked influence on the regular performance of purely physical functions.

Nerve force flows more readily down accustomed channels.

As there is no doubt that man possesses to a remarkable extent the power of directing nerve force into different channels, and influencing and inhibiting the action of organs whose functions would at first sight appear to be almost automatic ; and it is also certain that nerve force flows more readily through accustomed channels, so that a flow once directed down a certain track is likely to be continued, even after the controlling power has ceased to act upon it directly ; even in a deranged action, such as the discharge of nerve force in epilepsy, every occurrence of the paroxysm tends to establish the status epilepticus, as it has been termed. Some interesting observations in illustration of these facts will be found in Darwin's work on *Expression of the Emotions*. He speaks of "mental attention as having some power to influence the capillary circulation." He goes on to say that many sound observers "are convinced that

This is the case also in diseased actions.

Quotation from Darwin's work on *Expression of the Emotions*.



attention, or consciousness concentrated on almost any part of the body, produces some direct physical effect on it. This applies to the movements of the involuntary muscles, and of the voluntary muscles when acting involuntarily, to the secretion of the glands, to the activity of the senses and sensations, and even to the nutrition of parts. It is known that the involuntary movements of the heart are affected if close attention be paid to them. Gratiolet gives the case of a man who, by continually watching and counting his own pulse, at last caused one beat out of every six to intermit. On the other hand, my father told me of a careful observer who certainly had heart disease and died from it, and who positively stated that his pulse was habitually irregular to an extreme degree; yet, to his great disappointment, it invariably became regular as soon as my father entered the room. Sir H. Holland remarks that the effect upon the circulation of a part, from the consciousness suddenly directed and fixed upon it, is often obvious and immediate. Professor Laycock, who has particularly attended to phenomena of this nature, insists that when the attention is directed to any portion of the body, innervation and circulation are excited locally, and the functional development of that portion developed." He goes on to show how the involuntary muscles in connection with the peristaltic movements of the bowels

are affected by attention being drawn to them at particular times ; the same may be observed of the excitement of the sexual impulse.

I have made these somewhat lengthy quotations in order to show how greatly the whole nervous system is controlled by the will or consciousness, as Sir Henry Holland proposed to call it, and, that this being so, it is likely to affect diseases which are exclusively of nervous origin to a most important degree, either for good or ill—for good if the controlling power or consciousness act in a proper and restraining manner—for ill if the nerve current be allowed to distribute itself irregularly or accumulate too rapidly at any one point or points. The application, however, of these facts, will be better seen when we come to consider the treatment of the predisposing causes of epilepsy.

CHAPTER III.

OTHER NERVOUS DISORDERS, MORE ESPECIALLY HYSTERIA, ARE
CLOSELY ALLIED TO EPILEPSY—CASES IN ILLUSTRATION.

THERE is a large class of disorders of semi-con-
vulsive type, in which an absence of power of
nervous control is the chief cause. More especially
among these may be mentioned hysteria, and so
closely does this form of nervous disorder simulate
true epilepsy, that in many cases it is difficult to
determine to which class of disease they really
belong.

Hysteria may be said to be a form of nervous Hysteria.
disorder which owes its origin purely and simply
to want of controlling power. It is a disease
which may be said to be to a great extent a product
of civilisation, as a recent author has well expressed
it, when, in speaking of hysteria, he says, "Emotions
or feelings, as this name implies, try to go out in Origin of
hysteria.
action, and such actions, in primitive states of
society, would generally be appropriate to the
circumstances by which the emotion had been
excited ; thus, terror would naturally lead to flight,

anger to attack, and the emotion in either case would liberate motive force, which would be consumed in the direction indicated. In modern and complicated states of society, on the other hand, the emotions can no longer be taken as sufficient guides of conduct, and man is constantly called upon to control the actions which they prompt." Now it is to this very repression of emotion, this tying down, as it were, of the safety valve, that hysteria and its kindred nervous affections are mainly due. The feelings, pent back unnaturally, at last break down the barrier of controlling power, which becomes weaker and less able to resist with each defeat. The fact that hysteria and epilepsy both owe their origin to the same cause, has been noticed. The distinguishing point between them probably exists in the fact that in the former complaint the power of control is not entirely lost; it is always there, and although for the time overwhelmed by the emotional torrent, can be called forth and made to assert itself by the application of a sufficiently powerful stimulus. The hysterical attack, like the epileptic, will in a given time exhaust itself; the difference between them lies in the fact that in the former it is possible for the patient to check the progress of the paroxysm, in the latter this cannot be done. As might be expected, hysteria is far more prevalent among females than males. It would seem that

action
seen
in hysteria
and
epilepsy.

hysteria
is
likely
to
occur
more
in
females
than
in
males.

in the former there is a more active circulation of nerve force, coupled with a less strong controlling power. Again, the period of pubescence is in the female a far more trying ordeal. In the male the transition is more gradual, and less nervously exhaustive.

The deficiency of control of nerve power, which I have stated to be characteristic of the female, is certainly true also of immaturity generally. Statistics would also show that the capability of regulating nervous force grows and strengthens with the growth of the system as a far less liability to convulsive disease is found to exist after the second decennial period is past.

The close connection between epilepsy and hysteria is evidenced again by the fact that both are more frequently found to occur at the catamenial epoch. I am aware that this fact is doubted by Dr. Russell Reynolds; but I think that the opinion of most observers will be found to tend in an opposite direction.

Dr. Allan Hamilton of New York, in his valuable work on nervous disease, says, "I discover every day numerous verifications of the menstrual influence. In 40 patients I find that 18 occur (*sic*) during, or just after the days the woman has her catamenia, and in one case much interest arises from the fact that there was dysmenorrhœa, and that when this was relieved the attacks disappeared."

Epilepsy more frequent at menstrual periods.

Dr. Hamilton of New York quoted.

Sympathy;
its effect in
epilepsy.

Like hysteria, epilepsy possesses a strong sympathetic influence, another proof of its partially psychical origin. We are all familiar with the curious sympathy which exists in the simple nervous action of yawning, and the same may be noticed in connection with diseases of the complicated nature of convulsive and semi-convulsive types. On this subject, some valuable remarks

Dr. Watson
quoted.

will be found in Dr. Watson's *Principles and Practice of Medicine*, 5th Ed., p. 652, where he quotes Dr. Cullen, and Dr. Hardy of Bath, and gives some interesting cases. The effects of sympathy on epilepsy are so marked that some writers have even spoken of the disease as contagious. In consequence of this strong sympathy between patients thus afflicted, it is advisable that all cases of convulsive or semiconvulsive type should be as far as possible isolated from each other. And this is more especially important when these disorders have an emotional origin. It is a well-known fact that the nurses of epileptic patients frequently become themselves the subject of this disease.

Illustration
by three
cases.

This difficulty of diagnosis between the two diseases is well illustrated by the facts of three cases, two of which have recently come under my care, the third occurred in my practice some years since. In the first the attacks were extremely violent, the patient throwing herself about, and

Case V.

requiring considerable force to restrain her. During the seizure she occasionally spoke, though quite incoherently, would scream loudly, and cry out concerning some dreadful vision which was apparently passing before her. When the attack subsided she was sullen, but, upon being spoken to, would frequently fall back in a simulation of syncope. She professed to be quite unconscious of the seizures after they had occurred. These attacks continued at intervals for some three or four years, after which she was attacked with a violent neuralgia of the left ovary, accompanied with intense tenderness. Now, in this case, which Summing up of Case V. was really one of violent hysteria, breaking out occasionally into hysterical mania, the attacks bore considerable similarity to those of epilepsy, the distinguishing points being the fact of speech occurring during the paroxysms, which never happens in true epilepsy, and the fact that the convulsion was dissimilar from that of epilepsy, in being a series of combined efforts, not tonic passing into clonic spasms, and ending in a rapid and complete exhaustion.

In the second case, that of a young lady who Case VI. was lately under my care, the chief feature was the frequent occurrence of slight periods of total unconsciousness, coupled with occasional but rare outbursts of hysterical mania. The slight attacks precisely simulated the form of epilepsy

known as *petit mal*, the loss of consciousness being to all appearance complete. They were preceded by a slight muttering or hesitation of speech, and would occur many times in one day, sometimes even while walking, when she would give usually a slight stumble, but never fall. The attacks were more frequent at the catamenial epoch. She had a strong erotic tendency, and a powerfully hysterical disposition. These attacks were varied at long intervals by violent outbursts of hysterical mania lasting for hours, and attended by strong convulsions. Many facts, indeed, seemed to point to the view that the attacks were only a simulation of epilepsy, among others the almost entire absence of mental prostration, which in true cases of *petit mal* is usually a most prominent result.

Case VII.

The third case is in many respects similar, minus the clear hysterical history. In a young lady still under my care the attacks are simply those of *petit mal*. They occur at intervals of about a month, more commonly at the menstrual periods, and for a few days many will take place in the twenty-four hours, the unconsciousness is apparently complete, but the power of co-ordinate movement remains. Thus, supposing an attack to come on while walking, she would pass any point at which she might have desired to stop, the power of movement not being at all interfered with,

but consciousness being completely in abeyance.

Now, I should at once have classed this case as one of pure epilepsy but for the fact that there was a strong hysterical family history, and the slight effects which the attacks have had on the general mental condition. In all these cases, I may add that the bromides, usually so efficacious in hysteria, proved entirely useless, though in each case a fair trial was given to them.

Remarks on
Case VII.

CHAPTER IV.

THE PREDISPOSING CAUSES OF EPILEPSY ARE TWOFOLD—FIRST AND MOST IMPORTANT : A DEFICIENT POWER OF CONTROL AND REGULATION OF NERVOUS FORCE. SECOND, AN EXCITED AND HYPERSENSITIVE CONDITION OF THE NERVE CENTRES OF THE MEDULLA OBLONGATA.

THAT epilepsy is ever idiopathic, that is a *morbus a se*, I do not believe, though it may take its origin in a defect of which it is impossible to detect the presence post mortem—I mean a defective power of regulation and distribution of nervous force, that power which I have previously alluded to as constituting the main predisposing cause of epilepsy.

Perhaps the best mode of explaining the manner in which I believe an epileptic attack to arise from the combined action of the two causes which I have mentioned, is by watching what occurs when a nerve centre, whose action is confined to the carrying on of a definite function, is excited from over-stimulation or any other cause. Let us take, for example, the spinal nerve centres, which

are occupied in regulating the discharge of semen. This, it is well known, is a reflex action, but to a great extent under inhibitive control from the cerebrum, as is proved by the effects of timidity or fear. Now, in cases where these nerve centres have been much over-stimulated and excited by sexual excesses, they fall into precisely the condition which I wish to describe; in fact, they become to a certain extent epileptic, that is to say they are rendered liable to discharge their nerve force involuntarily, or upon the application of slight stimuli; more especially does this occur during sleep, when the restraining power is naturally less active, or altogether passive. No doubt this condition is coupled with a too active supply of arterial blood drawn to the spinal centres by the over-stimulation of the parts, and the consequent necessity for an active nutrition, but the derangement of the function is from first to last of a purely nervous character. The frequent micturition of children at night in bed is also a somewhat similar instance of the effect of the suspension of inhibitory power over a natural function. That there must be some such specific condition of the nervous system existing to induce epilepsy is evident. Sieveking plainly saw this when, in endeavouring to account for the epileptic seizure, he says—"Hence we must assume something more than the predisposing influences commonly so called—namely, a peculiar

Illustration
of epileptic
seizure from
action of
nerve centre
of spinal
cord after
over-stimula-
tion.

Sieveking
quoted.

habit of body which we are certainly unable to define, but which, for want of a better term, may be called a nervous diathesis." Now it is, I think, very clear that what Dr. Sieveking terms a nervous diathesis is in fact the very condition of which I have been speaking, viz.—the deficiency of the power which controls and regulates the distribution of nerve force. In regarding this deficient power of nervous control as the main factor in the production of epilepsy, we account also for the absence of all structural change in the nervous centres, a fact which has proved so bewildering to pathologists. In fact, if we regard the pathological changes which we do detect as consequences, not causes, of the disease, epilepsy may be described as a disorder dependent on the defective control of an unseen circulation. This being so, it is unnecessary to look to altered conditions of nutrition and changes of vascular circulation for the proximate causes of the disease.

Similar causes of irritation may exist in a number of persons, yet only a small percentage will become epileptic.

That some such condition must exist is rendered evident by the fact that precisely the same causes of irritation may exist in a number of persons, and yet in only a small percentage of them will epilepsy arise. Take, for instance, the irritations of the fifth nerves produced by the effects of teething. Numbers of children suffer excessively from this cause, but are never attacked with what are termed eclampsia or infantile convulsions, seizures identical

with those of epilepsy, and the same is true of disorders incident to adult life. Given a large number of persons affected with precisely the same causes of irritation, epilepsy will only occur in a certain small percentage.

The balance of both mind and body, so far as regards nervous power, being thus maintained, we shall now see how deviations from the normal standard produce either physical or psychical derangements. Nor is the congenital status of all in this respect equal, any one who is in the habit of inquiring into the history of those affected with the various forms of nervous disease cannot fail to be struck with the large proportion who owe their fatal inheritance to hereditary descent. Although I have generally found statistics to be really of little value, so difficult is it to ascertain facts of this nature from reluctant or obtuse patients, yet Herpin's tables, quoted by Sieveking, are interesting, though they probably fall far short of the real truth. He ascertained that 68 epileptic patients had 78 relatives who suffered from some form of nervous disorder. Now, as among these he only includes two as having suffered from hysteria and three from nervous excitability, it is evident, as Sieveking remarks, that he is clearly understating the facts.

To these may be added the tables of MM. Bouchel and Casauvieah, who state that in 110

Balance of both mind and body maintained by controlling power.

Hereditary descent.

Herpin's tables.

Additional statistics.

cases, 31 were hereditary; Esquirol states that in 321, 105 were hereditary, these latter were cases of epileptic insanity.

Dr. Hamilton of New York, speaking of epilepsy, says, "The influence of heredity is more strongly shown in epilepsy than in any other nervous disorder, except it may perhaps be progressive muscular atrophy. In cases of my own the taint can be traced back for several generations either by epilepsy, neuralgia, insanity, or other nervous diseases.

Leech and Fox fixed the proportion of epilepsy in whom hereditary taint was found at 36.3 per cent, which, so far as I can judge, is no exaggeration.

Reynolds states that in the upper classes this hereditary predisposition exists to a much greater extent, but calls attention to the difficulty of obtaining information. How great this influence of descent may really be it is hard to say, as all statistics are no doubt more or less unreliable. I think, however, that there can be no question but that its effect is greater in this than in any other form of nervous disease. I have myself found it acknowledged in about one-third of my cases, which is probably quite within the mark; feeling no reliance on the accuracy of statistical information on this point, I abstain from giving any table.

At the same time it is not at all necessary that because a person has suffered from epilepsy he must transmit the disease to his children, but in most cases, when the want of power of nervous control has been transmitted, it will be found that there is a strong tendency to run into vicious excess, more especially in the two directions of venery and over-stimulation by alcohol, and thus an exciting cause is added to the already existing predisposition.

In my experience I have found epilepsy when dependent on hereditary transmission to manifest itself more frequently prior to puberty.

Now, whether the want of controlling power be congenital, as it probably more often is, at any rate to some extent, or induced, its existence is not difficult to detect.

We have then two conditions which are eminently conducive to epilepsy—First, a deficiency of the power which controls and regulates the distribution of nerve power. This is probably the most important and imperative factor. Second, an excited and hypersensitive state of the nerve centres of the medulla oblongata. This may be and often is brought on or aggravated by outside sources of irritation. Recapitulation.

CHAPTER V.

EXCITING CAUSES OF EPILEPSY—TABLES OF STATISTICS.

Exciting
causes of
epilepsy,
physical and
psychical.

IF, then, we suppose the nerve centres of the medulla oblongata to be in an excited and hyper-sensitive condition and fully charged, and the normal controlling power which should hold these cells in restraint to be deficient or absent, it naturally follows that but slight exciting causes will be sufficient to bring about a discharge of the current of nerve force. And this brings us to the consideration of exciting causes in general. These may be of two kinds, physical or emotional. The former, by far the more common, generally originate in the irritation of the peripheræ of sensory nerves, and if these nerves, as very commonly happens, are such as are in direct communication with the nerve centres of the medulla oblongata, for instance the pneumogastric or the glosso-pharyngeal, the impression is conveyed direct to the excited and over-charged centres, and is liable to produce an almost instantaneous explosion. If, however, the irritating cause be situated at a greater distance, and in parts

less closely in relation with the medulla oblongata, the impression has to be transmitted through the nerve ganglia of the spinal cord to the point above mentioned, when the same phenomena occur, but after the lapse probably of a longer interval.

To attempt to catalogue the various forms of exciting cause which may give rise to the epileptic seizure would be impossible; so great their variety, and so protean their shape, it must suffice to notice some of the more prominent. The pneumogastric is probably more frequently than any other nerve the medium through which the sense of irritation is conveyed to the medulla oblongata; as the branches of this nerve may, as we know, be affected by causes originating in the pharynx during the act of deglutition (see cases mentioned previously), in the glottis, epiglottis, or larynx, through the superior laryngeal nerve, in the lung through the pulmonary branches, and in the stomach through the gastric branches, it is easy to see how numerous may be the forms of irritation which, acting through these various channels, may suffice to upset the nervous balance. It would appear at first sight as though the more intimate and direct the communication of the nerve irritated with the nerve centres of the medulla, the more rapid would be the discharge of the nervous power, but the explosion (if one may use the term) is probably more dependent

Impossible to catalogue exciting causes.

Pneumogastric frequently involved.

Rapidity of attack chiefly due to excited condition of nerve centres and deficiency of control, not to proximity of nerve irritated.

Exciting
causes of
epilepsy very
numerous.

on the condition of excitement of the nerve centres, and the deficiency of controlling power, than on the extent or locality of the exciting cause. To give an idea of the impossibility of attempting to do more than mention some of the more prominent forms of exciting causes of epilepsy, it need only be shown that they are to be found, not merely in actual causes of irritation of the peripheral nerves, as in teething, or the irritation produced by worms in the intestines, but also in the functional derangements of organs, as from defective action of the liver, or from congested conditions, or flexions of the uterus. Again, similar results are produced by the various deteriorations or poisonings of the blood, and by mechanical causes, such as the formation of bony growths or clots of blood extravasated within the cranium. With reference to the manner in which mechanical causes of irritation situated within the cranium act on the medulla oblongata, Pflüger has shown that cerebral nerves, when subject to irritation, reflect their irritability downwards towards the medulla. In a most interesting case which occurred in my practice, where an intercranial node produced severe epilepsy, the aura which occurred always commenced in the left hand and arm.

Tendency to
epilepsy
greater in
infancy.

I have previously stated that the tendency to convulsion is far greater in infancy, in consequence of the controlling power of the nervous system

being as yet immature. In consequence of this the nervous distribution is far less regular, and the nerve centres are more apt to become surcharged. If you watch an infant lying in a cradle, or in its nurse's arms, you see by the irregular jerking movements of the limbs to how small an extent the muscles are under control. All reflex actions are in the infant also far less under inhibitive restraint, take, for instance, the acts of defæcation and micturition, the effect also of sudden shocks or stimuli is far greater. As the child grows older the same is seen to be true of the emotions, the power of mental restraint being far less than in the adult. Thus we find that causes which in the adult would be productive of no ill effect, are sufficient in the infant to force on convulsion. It is from this cause that irritations of the fifth nerve in teething, slight derangements of the liver or stomach, or the irritation of worms, are sufficient in infants to produce effects, while the more matured power of adult life is enabled to resist even greater causes of irritation. In many cases the gradual strengthening of the controlling power as the child advances in age is sufficient to enable the system to throw off the tendency to attack, and to prevent it from ripening into confirmed epilepsy. In some cases, however, it is found that the attacks which commenced as infantile convulsions are continued during youth

Emotions
also more
difficult to
control in
youth.

Slight irrita-
tions in
youth act
as exciting
causes.

Gradual
strengthen-
ing of power
of control as
child grows
older enables
it to throw
off tendency
to attack.

Exciting
causes.

and maturity. It is also not uncommon to find the disease reappear later in life after a longer or shorter interval. Although it will be necessary to describe some of the more prominent causes which are found liable to excite the epileptic convulsion, yet, so far at any rate as regards the treatment of the disease, the main points to which we have to pay attention are the two predisposing causes to which we have already referred.

Statistics
unsatisfac-
tory.

Statistics regarding the exciting causes of epilepsy are, I believe, unsatisfactory and unreliable, and vast discrepancies will be found between those furnished by different writers on the subject.

Dr. Sieve-
king's table
of exciting
causes.

Of Dr. Sieveking's analysis of 104 cases, 41 were found to have a physical, and 15 a psychical cause, in the remainder the exciting cause was

Leuret's
table of ex-
citing causes.

unknown. Leuret's table of 106 cases gives the ascertained causes of 63 cases; of these 37, or rather more than one-half, are psychical; 26 are

M. Calmeil's
table of ex-
citing causes.

of a purely physical nature. M. Calmeil's statistical table of 240 female patients gives a recognised exciting cause in 172. 142 of these owed their origin to psychical causes, only 34 to physical, the former thus outnumbering the latter by over four to one. Now, if we compare these tables, we shall see that the discrepancies are so great that it is probable that statistics on this point are of little real value. Thus Sieveking gives psychical causes 15, physical 41, or nearly three to one in

Sieveking's
statistics of
exciting
causes

favour of a physical cause. Leuret, psychical 37, physical 26, or considerably more than one-half as due to psychical influences; while Calmeil gives still more positive evidence in favour of emotional causes, for according to his tables four were thus originated to every one which was produced by physical derangements. Although I consider that the difficulties in the way of obtaining reliable facts are so great as to render statistics on this subject well nigh worthless, I have thought it not unfit, more perhaps for curiosity sake, to add a table of my own, which embraces the history of 110 cases of which I have been enabled to procure accurate notes.

Exciting causes of the epileptic seizure :—

Too free use of stimulants	3
Masturbation and venereal excesses	14
Hereditary tendency	4
Overstrain of brain	6
Menstrual derangements	12
Mental shock	10
Fright	5
Indigestion	3
Over fatigue	2
Exhausting illness	2
Severe blood-letting	1
After miscarriage or confinement	4
Deterioration of health	2
Bad air	1

Carry forward 69

	Brought forward	69
Following sunstroke		2
Blow on head		3
Syphilis		2
Following scarlet fever		2
Dentition		2
Unknown		30
		<hr/>
		110
		<hr/>

Analysing this table on the same principle as the three foregoing ones, we find that 59 are due to physical causes, 21 to psychical, and that 30 have an unknown origin; thus the former outnumber the latter by nearly three to one. The large proportion of those who were unable to give any definite origin for their seizures is again to be observed. I have no doubt but that in many cases it is difficult for patients to say when their disease really commenced, as non-convulsive attacks so frequently precede the convulsive, that the patient may hardly recognise the fact that he was suffering from epilepsy until his first convulsive seizure. Many, again, are most unwilling to admit any hereditary tendency or sexual causes, though, probably, if the truth were known, they are by far the most common antecedents to this form of nervous disorder. Indeed to the latter, as exciting causes of epilepsy, I am inclined to attach the utmost importance, and I think that too little attention has by most authors been directed to

Unwilling-
ness to admit
hereditary
and sexual
causes.

Sexual
causes of
epilepsy.

them. Statistics show us that a very large proportion of cases arise at or about puberty, or during the second decennial period of life; Dr. Allan Hamilton, of New York, in his valuable work on nervous diseases, gives some important statistics upon this point. In 183 cases which came under his own care, the ages at which the disease appeared were as follow:—

	M.	F.	Total.
Under 10 years . . .	16	10	26
Between 10 and 20 . .	23	48	71
„ 20 „ 30 . .	27	14	41
„ 30 „ 50 . .	29	11	40
Over 50	4	1	5
	<hr/>	<hr/>	<hr/>
	99	84	183
	<hr/>	<hr/>	<hr/>

Hugen¹ gives a table prepared by Martinet to show the proportion of cases which occurred during the second decennial period, which is well worth quoting:—

In 307 cases collected by Musset there were 107			
„ 68	„	Herpin	27
„ 83	„	Maisonneuve	46
„ 306	„	Alègre	105
„ 106	„	Leuret	42
„ 230	„	Moreau	76
„ 43	„	Dunant	26
„ 70	„	Delasiauve	17
„ 75	„	Dussart	40

¹ *Recherches sur les causes de l'Epilepsie.* Paris, 1876.

In addition to these, Beau collected 273 cases, in 43 of which the disease began between the 6th and 12th, 49 between the 12th and 16th, and 17 between the 16th and 20th years.

At this period of life, when changes so great and so important are taking place in the constitution, it is not strange if the nervous balance be found to be frequently upset. Again, the derangements of general health due to functional disorder of the sexual organs, especially in the female, are many, and would appear to have an especial influence in determining towards nervous derangements. Again, so many patients, chiefly of the male sex, admit the early abuse of sexual power, that a careful observer cannot fail to detect an intimate relation between the occurrence of puberty and epilepsy.

Connection
between
epilepsy and
sexual act.

It would appear, indeed, almost as if a connection existed between the sexual act and an epileptic seizure; for, although it is in itself an almost purely spinal action, yet it would seem, in some much more than in others, to partake almost of the character of a slight convulsion. I have known many instances in which it has been followed by complete syncope, and a partial and short loss of consciousness is not uncommon. Galen, who quotes from an older authority (Democritus), terms it *μικρα επιληψια*, a slight epilepsy; complete epilepsy has been known not unfrequently to follow it; the first Napoleon is said to have been

thus affected on many occasions. On looking through my case-book, I am able to identify this as an exciting cause of epilepsy far more distinctly and frequently than any other given cause. Dr. Watson, also, who speaks very strongly upon this subject in his description of the epileptic, draws a portrait which might equally apply to the young man who has exhausted his system by venereal excess; he says, "Taking epileptic people as a class, you will find them to be generally characterised by weakness and irritability of mind and body, and not by steadfastness and vigour, by a lack rather than an excess of vitality, more timid than bold."

Venereal
excess.
Dr. Watson,
5th edition,
p. 650.

Alcoholism is another exciting cause which I cannot pass over without mention. This may act in one of two ways: the blood-poisoning resulting from the presence of large quantities of alcohol in the circulation may, and frequently does, bring on convulsion, or the nervous prostration following lengthened debauchery and over-stimulation may produce a similar effect. In the former case the attacks of epilepsy are less likely to become permanent than when they follow an exhausted nervous condition, and they are on the whole more easily accessible to treatment.


With regard to the poisoning of blood by specific poisons, as of scarlet fever or small-pox, I have never seen this produce epilepsy except in

children, but I have known a case in which a young child whom I had apparently cured of epilepsy of some years' standing, suffered from a relapse on being attacked with measles.

There are some admirable remarks in Dr. Allan Hamilton's work on nervous diseases, with regard to influence of climate and atmospheric changes on epileptics. Having made careful observations, he found that sudden changes of weather had a decidedly prejudicial effect. This I am certainly inclined to confirm ; at any rate I am quite convinced that hot thundery weather is always likely to cause an increase or renewal of the attacks ; this is directly in opposition to the observations of Moreau, who thought that the seizures were more frequent in winter.

Emotional
causes.

In speaking of emotional causes we must always bear in mind that, like the physical ones we have just dealt with, they can only act as excitants. Among the most prominent of them is fright. Leuret indeed accounts for 37 out of 67 cases as having been produced by this cause. Here, however, as with regard to physical exciting causes, statistics are, I think, unreliable. I should myself have been inclined to rate the importance of anxiety as an exciting cause above that of fear. Other emotions, such as joy, grief, fear, act precisely in the same manner, though the disease is less often assigned to their influence. In con-



firmation of what I have written on the subject of the exciting causes of epilepsy, I cannot conclude better than by quoting two paragraphs from Dr. Russell Reynolds's valuable work. He says :—

“ The remote causes of the disease are as many as the organs of the body, and as various as the circumstances by which these may be affected. It must, however, be distinctly understood, that such modes of inducing the affection are not essential, but that epilepsy is an idiopathic disease ;” and again, he adds, “ So varied therefore are the directions from which disturbing causes come, that grave doubts may be entertained as to the efficiency or sufficiency of any of them ; and we are led to regard, as of far greater importance, the constitutional condition upon which these disturbances may act.”

Quotation from Dr. R. Reynolds on manifold nature of exciting causes.

Exciting causes quite insufficient without a predisposing cause.

In concluding this portion of the subject we may say that any exciting cause may, by weakening or irritating the general nervous system, produce epilepsy, provided that there is a predisposing cause in existence in the shape of a deficient power of nervous control. The only exception to this rule is where an exciting cause is of so powerful a description that it is able to force on convulsions by overwhelming the regulating power.

CHAPTER VI.

TREATMENT OF FIRST PREDISPOSING CAUSE.

Treatment
of epilepsy.

WE come now to the most important part of our subject, the treatment of epilepsy. In proceeding to the consideration of this, we may first remark that the treatment of the exciting causes of the disease is, in the majority of cases, of little or no value, unless we can previously or simultaneously remove the predisposing causes; and it is to effect this that all our efforts should be directed. With regard to the first of these predisposing causes—viz. the deficient power of control of nerve-force—it might almost be looked upon as a matter of doubt how far it is possible to increase or revive this when it is deficient or absent, but I propose to show that this may be done.

There is no doubt that at certain times, and under certain circumstances, this power of nervous control exists more strongly, and exerts more influence, than at others. And we shall find that the strength or weakness of this power depends, to a great extent, upon circumstances which tend

to improve or exhaust our physical strength. We have seen that, up to the period of pubescence, there is a gradual increase and strengthening of this power. We find also that it is manifestly deficient after exhausting illnesses, after venereal excess, or over-stimulation. We also see it diminished at and after the catamenial epoch. It follows, therefore, that any measures which are calculated to exercise a favourable influence on the general physical condition of our patient will have a corresponding effect in increasing and perfecting his power of nervous control. Again, it is, I think, probable that this power may be greatly strengthened and increased by force of mind directed towards it, and by habit. Thus it is well known that we can more strongly resist the reflex action of drawing up the legs when the feet are tickled by an exercise of a strong effort of will. Darwin notices these facts, and remarks that he could in all cases markedly influence reflex action by exercising his power of control, except in the one instance, that of withdrawing his head when the cobra struck at the glass of the cage, which movement he was unable to restrain.

Exhausting influences weaken power of control.

Power of control may be strengthened by habit.


Treatment. Strengthening of controlling power of nervous system.

Now, if the remarks which I have made in a former chapter, strengthened as they are by the observations of some of our most intelligent observers, have any truth in them, it is evident that man is able to exercise considerable influence

over the direction of nerve force, and it is equally evident that this faculty may be increased by cultivation, and concentration of mind towards it.

Darwin on
*Expression
of Emotions*,
p. 349.

I cannot do better than quote Darwin's summing up upon this point; he says—"Experience shows that nerve force is generated and set free whenever the cerebro-spinal system is excited. The direction which this nerve force follows is necessarily determined by the lines of connection between the nerve cells with each other and with various parts of the body; but the direction is likewise much influenced by habit, inasmuch as nerve force passes readily along accustomed channels." That is to say, direct the will or control steadily in one direction, and you will induce a nerve current to set towards that part; continue this steadily and the action will become habitual. Governed by this principle, I have for some time induced my patients to remove their attention as far as possible from their ailment and its seat, and to concentrate their will on some distant point. As epileptics very commonly suffer from cold feet, it is an excellent plan to impress on them the importance of constantly bearing in mind the condition of the circulation in their lower extremities, and to endeavour, by every means, to render the circulation in these parts more equal. If you can sufficiently inculcate this upon them, it has the twofold advantage of with-



drawing the attention from the real seat of mischief and concentrating it on a portion of the body to which the nerve current is of great importance.

Again, it is a well-known fact that in many cases of epilepsy the patient is able, by an effort of will, to throw off or postpone the attack, when a sufficiently long interval of warning is given. If the question be put, Have you any power of warding off or preventing seizures, the answer will very commonly be in the affirmative, for even in the most severe cases the attacks will be found to vary considerably in intensity, and the most sudden and severely convulsive paroxysms are often alternated with nervous sensations and premonitions of attack. Now, when this possibility exists, it is always best to encourage the patient to use and increase the power by every means. In many cases patients are apt to think that their medical man or some other person has power to help them to ward off the seizure. In this way many epileptics acquire a strong feeling in favour of so-called mesmeric influence. In some cases I have seen this force of will exercised for over an hour at a time, and in the end ward off the attack. In one case, I can without doubt attribute the ultimate recovery to the strong inhibitive power possessed by the patient, though it must, I think, be admitted, that, as a rule, when a long period of warning elapses previous to an attack, the

Ability of epileptics to ward off attack by power of will.

nerve centres of the medulla oblongata are not strongly excited.

Influence of
new remedies
in checking
attack.

Another fact which points strongly to the influence of mind on the epileptic, is to be found in the manner in which faith in a new remedy procures immunity from seizure. It very commonly happens that the trial of a new drug or of a fresh system of treatment will have a marked influence in relieving the patient from his attacks for a greater or less time. Esquirol, in allusion to this point, says, "Toujours une nouvelle medication suspendait les acces pendant quinze jours chez les unes pendant une mois, deux mois chez les autres et même pendant trois mois." I am inclined to lay more stress upon this the psychical plan of treatment, as it may be termed, as it seems to me to have been up to this time very much neglected, and given over to the empirics. For recognising, as I do, the very powerful influence which the will is able to exercise over all vital functions, even those which appear most automatic, it seems to me that, in neglecting its agency, as a means of combating and checking disordered nervous action, we are abandoning a most valuable weapon. I have for some time adopted this plan as an accessory to the ordinary medical routine of treatment, and in many instances with marked success. And in all cases of epilepsy I should advise that the most should be made of

it by placing the patient under a regular mental training, withdrawing the attention so far as may be, not only from his ailment and all the symptoms in connection with it, but also from the parts concerned in its development. At the same time he should be impressed to use and strengthen, by every means, his natural power of control, resisting all nervous symptoms, more especially when they have any relation to the accession of an attack. Leaving this aspect of the question, and coming to more mechanical forms of treatment, it will be found that all measures which tend to the toning and strengthening of the nervous system generally, having regard more especially to the regular distribution of nervous force, add power to the control, and render it less likely to be upset. A strict attention to general hygiene will therefore be found to be of the utmost importance. Exercise should be taken every day, care being taken that it is not carried beyond strictly moderate bounds, as fatigue of all kinds is to be deprecated. At the same time the mind should as far as possible be diverted, and thought directed into healthy but non-exciting channels. The patient should also be kept studiously apart from all persons of weak mind or hysterical tendency, for as the mental sympathy is, as we have shown, strongly developed, a powerful will can produce a great mental influence. It is for this reason that I have generally found it

General treatment of first predisposing cause.

better, especially with children, that they should be removed from within the range of family influence, this is more especially important where a hereditary nervous disposition exists, so that not only are they removed from the danger of nervous sympathy, but I have always found that such patients will, when among strangers, be far more likely to develope and strengthen the power of nervous control. A fairly liberal diet, food being taken only in small quantities at a time ; a moderate supply of stimulant of the most nourishing kind, good sound claret, or bitter ale, being the best. Excellent effects are to be obtained from the use of cold as a derivative and general tonic. The form which I find most useful is that of the cold sitz bath, either night and morning, or even oftener ; regard being always had to the constitution, age, and sex of the patient, and also to the temperature. In all cases it should be followed by the use of active friction to the whole skin, either with horse-hair gloves or a warm rough towel. In speaking of medicines, I most strongly advocate the use of nervine tonics, and among these strychnia undoubtedly occupies the first place, and the manner in which it is tolerated by the epileptic, without producing any signs of its ordinary effects, is remarkable, and seems to me to afford an indirect evidence of its suitability to the

removal of the nervous conditions which precede and accompany the disorder. Although, as I have just remarked, it is in these cases tolerated to a remarkable degree, yet I prefer its exhibition in small frequently-repeated doses, thereby nourishing and not stimulating nervous power. I shall endeavour presently to explain its specific tonic action on the nervous system more accurately, especially with reference to its effect in epilepsy and other convulsive disorders.

CHAPTER VII.

TREATMENT OF SECOND PREDISPOSING CAUSE.

Treatment of
second pre-
disposing
cause, viz.
hypersensi-
tive condi-
tion of nerve
centres of
medulla
oblongata.

WITH regard to the treatment of the second predisposing cause, viz. the excited and hypersensitive condition of the nerve centres of the medulla oblongata, there is much more to be said.

I consider this condition to be secondary in importance to the first predisposing cause only, by reason of the fact that it rarely occurs, at any rate to any formidable extent, unless the first cause, viz. a deficient power of control of the nervous system, be in existence, for it is plain that if a proper regulation of nerve force exists, an excess or congestion cannot take place in any one spot to the detriment of the rest of the system. Having then by every possible means strengthened the power of control of the nervous distribution, it remains to deal with the nerve centres of the medulla oblongata, and place them as far as may be in a healthy and normal condition. This is to be effected by two methods—by medicinal means, and by powerful derivative action. Almost all

writers upon epilepsy have, in remarking upon treatment, borne testimony to the markedly beneficial results which they have in some cases seen follow the employment of counter-irritant or derivative measures in some form or other. Among others who extol this plan of treatment I may mention Van der Kolk, Sieveking, Romberg, all of whom speak in high terms of its success. Now, as in any plan of treatment which we may adopt, we must never forget that epilepsy is a disease which has its origin distinctly in a weakness of nerve power, we must be careful that the means of counter-irritation which we employ do not unnecessarily exhaust our patient. Bearing this fact in mind, I have been for some time in the habit of using a derivative plan of treatment which, while powerfully tonic in its effects, is at the same time actively derivative as regards both vascular and nervous circulation. I place my patient, having regard in all cases to his age, sex, and vital power, once, twice, thrice, or even more times daily in a cold sitz bath, for a time extending in duration from half a minute up to ten or even more minutes. At the expiration of this time he is rubbed dry with warm, rough towels, and the skin of the lower part of the spine, hips, and lower extremities is then stimulated with horse-hair gloves until a thorough derivative action is set up. I find that after a short time not only

Effect of cold
sitz bath as a
derivative.

does a remarkable improvement in general health show itself, but also a marked increase in general nervous circulation, coupled with a more regular distribution of nerve power, and corresponding diminution of attack. In children the effect of the cold sitz bath is often almost immediate. I frequently see children who have been liable to two and three attacks in the day obtain an almost complete immunity from the time of commencing the tonic cold treatment, and although at first it is somewhat of a shock to very young children, yet they soon become inured to, and learn not to dislike it. Its action on sleep, which in epileptics is apt to be disturbed, uneasy, and dreamful, is most marked, it becomes very soon sound and refreshing. In delicate females, and in one class of case which I shall presently describe, I am in the habit of prescribing a warm bath first with a free use of soap, this is followed by a cold affusion, and a steady and systematic rubbing, which must be continued for some time until the circulation is thoroughly stimulated. In cold weather, and in elderly or very young patients, I give the cold sitz in front of a fire, so that the patient's feet are towards the warmth. I may state, however, that it is but rarely, even in the most delicate females, that I am obliged to have recourse to the warm water. The class of cases to which I made reference just now is one in

which the skin will be found to have an offensive exhalation, often coupled with a dark unhealthy hue, and the presence of numerous acne, with a considerable roughness. When this condition exists, the plan I have mentioned will be found very efficacious in cleansing the pores, and so improving the general healthy condition.

I have described this as the most usual form of derivative which I adopt, yet I am by no means prepared to say that in many cases it may not be wise to resort to stronger or more active measures. In some cases, especially where there are signs of congestion of the head and neck, local forms of depletion are demanded, and are often most effective. The means I usually adopt are setons, issues, or blisters, and I generally place them as close to the medulla oblongata as possible, as this position will generally be found not only more convenient, but the derivative will possess greater power by more immediately and completely draining the nerve centres of that important part. In the case of a young clergyman in whom the disease, Derivative methods of treatment besides cold. Case VIII. the result of overwork at the university, had existed for many years, and had resisted all forms of treatment, a seton proved a most efficacious remedy. Active exercise in the open air, when it can be taken, will also be found serviceable, but it should never be carried to fatigue. At the same time early hours should be strictly enjoined, and an entire

All overwork
or excitement to be
avoided.

Diet.

absence of all excitement or anxiety. The business man should be taken away from his overwork, and the student from his books, and nothing beyond the lightest forms of amusement should be permitted. At the same time great care must be bestowed upon the diet. Food should be taken often and in small quantities, as in many patients a full meal will be found frequently to act as an exciting cause. Meat should as a rule be only taken once in the day, and then only mutton and beef, to the entire exclusion of veal and pork, the meat meal should also be at or near midday, as solid food at night is always to be avoided. I am in the habit of strongly recommending milk as an article of diet in the disease, as the digestion is so very frequently defective in these cases, even where it is not directly implicated as an exciting cause. I look upon the selection and regulation of the diet as of the utmost importance. Patients at a distance I am in the habit of supplying with a written diet list, which gives them full directions as to what to eat, drink, and avoid.

Fish, as might be expected from its nerve feeding properties, should be largely employed, and an admirable article of diet is to be found in the brains of sheep or calves dressed in various ways.

In some cases a capricious or even perverted appetite is found in epilepsy, a craving for meat in large quantity. When the digestion is more

than ordinarily defective, I have often recommended the pepsine prepared by Messrs. Bullock, of Hanover Street, W., and either this or a combination of this pepsine with maltine in the form of Peptomalt, as prepared by Messrs. Johnson of Great Malvern, I have frequently found most efficacious in increasing the powers of digestion and assimilation.

Beyond a careful superintendence of the diet it is most necessary that attention should be paid to the mode of eating; this is especially important with children, who, unless watched, are apt to eat hurriedly, and without sufficient proper mastication. At night the patient should sleep in a cool room, with the head well raised, not by pillows, which, as Dr. Russell Reynolds points out, tend to keep the head hot, but by an inclined plane underneath the mattress; this of course is especially important when the attacks are liable to occur at night. The patient should never be allowed to frequent theatres, churches, or places of amusement, more particularly at night. In one case the patient distinctly attributed his first seizure to being exposed to bad air in a hot, crowded church at night. And the very fact of passing among a number of people, even in the open air, will often cause giddiness and a tendency to seizure. Case X.

Although it is, of course, of the utmost importance that epileptic patients should be carefully

attended to, lest they should at any time do themselves injury during a paroxysm, yet I am much averse to allowing such patients to become too dependent on others, which they are, from their naturally deficient will, liable to do. I have often noticed a markedly good result to follow when a patient has been placed in a more independent position. He is thus more thrown upon his own resources, and is more likely to increase and strengthen his latent power of control.

CHAPTER VIII.

USE AND ACTION OF STRYCHNIA.

WITH regard to medicinal remedies in epilepsy, twenty years' experience in the treatment of this disease has convinced me that a tonic and derivative plan, steadily pursued, is the only one likely to meet with real and permanent success. During this period I have either used myself, or seen used by others, almost all the drugs contained in the Pharmacopœia, but I have rarely seen any lasting good results follow the administration of any but such as had the effect of toning and bracing the nervous system. Of the treatment by Bromides I shall speak presently; but, though undoubtedly efficacious in temporarily checking the attacks, they will be found, I think, rarely to effect a permanent cure.

Many years ago I first published in a small pamphlet my experience of the action of strychnia in relieving and removing the epileptic condition. Since that time my experience has been widened by the treatment of very many cases, the result of

which, coupled with fresh facts, I have from time to time given to the public. I may say that my confidence in the power of this remedy to supply to the nervous system the controlling and regulating force, the absence of which I believe to be the main cause of the disorder, is in every way strengthened and confirmed. I now propose to enter more thoroughly than I have hitherto done into what I believe to be its physiological action, and to illustrate its effects by selections from my Case-book. I will first quote an extract from one of my earliest books, which will show in what way I was first led to make trial of this remedy in epilepsy.

Any one who will refer to Professor Van der Kolk's work on the medulla oblongata and epilepsy, will find the following passage.

After stating the cause of the disease to be an exalted sensibility of the medulla oblongata, he goes on to say:—"We are aware that strychnia exalts the capacity for reflex action to an extraordinary degree, and gives rise to spasms, and finally to violent convulsions. Now it is well known that if we give strychnia to animals, and afterwards administer conia, these convulsions cease. I flattered myself that a small dose of conia should, therefore, diminish the reflex capacity for epilepsy, and that I should thus have found a means of directly removing the proximate cause of the disease. I now gave this remedy (conia)

to three epileptics of long standing (among whom was an unmarried woman aged thirty), who were all attacked every eight or eleven days, sometimes at longer, sometimes at shorter intervals, with violent epileptic fits, and with whom I had already in vain tried several remedies. I prescribed a thirtieth of a grain of conia three times a day ; so early, however, as on the second and third days, I was obliged to give up this medicine, as in all three patients the attacks were increased so very much in SEVERITY and NUMBER, that several violent fits occurred in one day. I saw that the reflex action was not diminished, but exalted by the drug, and that I had tried a most injurious medicine in epilepsy."

Now what is the inference to be drawn from the facts which he here states ? Why, I think it is very plain. Strychnia in large doses produces convulsions, which conia relieves ; but conia in epileptics most decidedly aggravates the attacks ; what, then, more natural than to look to its antagonistic—strychnia—to give the required tone to the medulla oblongata and thus relieve the attacks ?

Since this was written, now many years since, experience has confirmed in the most positive manner the truth of the deduction which I then drew from Van der Kolk's facts.

It is my purpose now to endeavour as far as I can to show the manner in which this remedy

exercises so powerful an effect in controlling those derangements of the nervous system which give rise to epilepsy.

It is evident that the first action of strychnia on the spinal cord is to set up an increased activity of the nerve centres of that part—more especially so in those of the lumbar region—not only by stimulating their sensory powers, but also by increasing their motor instability; in short, producing a general increased excitability of these parts. These facts are evidenced by the increased sensory action of the peripheral nerves, and by the manner in which the muscles reply to the stimuli thus created. No doubt an increased vascularity follows this increased activity of these nerve centres.

Thus we find that in consequence of this increase of general sensory and motor action, the functions of organs which derive their power from the nerve centres of the spinal cord, more especially (and this is an important fact) from the lower or lumbar region, are stimulated; thus we find irritability of the bladder to occur with an increased flow of urine; the organs of reproduction are also greatly stimulated. An old clergyman, an epileptic of many years, who ultimately owed his recovery to this medicine, once told me that "he was sure he was getting well, as he found his virile power returning."

In animals also the effects of strychnia are the

same, as experiments conducted by Van der Kolk and others will be found strongly confirmatory of the facts I have mentioned. In dogs poisoned with strychnia, Van der Kolk found the hind legs first and most powerfully affected, and after death the lumbar portion of the spinal cord was found in a highly vascular condition, at times amounting to capillary dilatation.

In addition to these facts, Michael Foster states that the effect of strychnia is to delay, but not to diminish, the effects of reflex action; he says (p. 540)—“When a frog is poisoned with small doses of strychnia, the reflex movements caused by a very slight stimulus may be very great, but the period of incubation may be the same as that of a frog in a normal condition; when the dose is increased, the period, instead of being diminished, is increased, the increase being very considerable when minimum stimuli are employed, but much less marked with strong stimuli.” He noticed similar effects to follow the injection of quinine into the blood. I may here mention that I consider quinine to have a somewhat similar though far less powerful effect on the centres of the spinal cord, and thus upon epilepsy. A very carefully written paper on the use of quinine in epilepsy, by my friend Dr. Clapton, late of St. Thomas's Hospital,¹ will be found interesting in relation to these facts.

¹ See vol. i., new series, St. Thomas's Hospital Reports.

Mode of
action of
strychnia.

Now I think the foregoing remarks show clearly how great an increase of activity is caused in the nerve centres of the lower portion of the spinal cord by the action of strychnia, and this increase takes place, no doubt, partly at the expense of the brain and upper portions of the cord, including the medulla oblongata. For, in poisoning by strychnia, although the medulla oblongata forms the medium by which the convulsions become general, yet it is probable that it is in itself not over-stimulated, as the brain and organs which are supplied with nerve power from it are unaffected. Thus, the mind retains its perfect clearness during the most violent convulsions caused by strychnia poisoning. Now it stands to reason, that if a sudden increase of activity is caused in the nervous power of the lower portion of the cord, the upper parts and the brain will be to some extent drained of their nerve force, and thus rendered less sensitive, and it is in this manner, I believe, that the small doses of strychnia act—by relieving the nervously congested state of the medulla oblongata, and thus lessening its hypersensitiveness.

One point is of great importance in the administration of this remedy, and this is that its use must be continued over a considerable length of time. Although the tolerance with which the drug is borne by the epileptic is very remarkable, yet I find in practice that the small frequently repeated

doses have the best and most lasting effect. I think that this is one reason why all previous experience of the drug has failed. Marshall Hall used it, and thought highly of its action, and although he used only small doses, yet I think failed to continue it for sufficiently long periods. Bayle speaks of it as having been used advantageously in this disease, and in the *New York Medical Times* Dr. Elisha Harris reports several cases in which it acted favourably. Dr. Hamilton, also of New York, a man of great experience in the treatment of nervous disease, says of it, "In small doses it certainly does good."

Marshall Hall's opinions of strychnia.

Bayle's opinion.

Dr. E. Harris of New York.
Dr. Allan Hamilton.

The marked influence of the bromides in checking the convulsions, not only of epilepsy, but also of hysteria and eclampsia, has led to their almost universal adoption in the treatment of the former disease. But as the action of all this class of remedy is to depress and devitalise the nervous system, and by this means prevent the explosion of nerve force, we can hardly expect to derive any permanent benefit from their use, however great may be their palliative effect, and so it proves in a large majority of cases.

Action of bromides.

The anti-convulsive properties of these remedies are due to the power which they possess of lowering the activity of the nerve centres of the whole cerebro-spinal system. This action is well illustrated by the occurrence of impotence in many

cases from their use, also by their effect on the various forms of hysteria connected with uterine derangements or irregularity. It was principally owing to its decided effect in these latter cases, that its use was first suggested by Sir Charles Locock. But its action is not confined to the nerve centres of the lower portion of the spinal cord. It, no doubt, has an equally though perhaps a secondary effect on those of the medulla oblongata, and its cerebral action is plainly manifested in the stupidity and drowsiness caused by large doses of the drug.

In many respects bromides may be said to be antagonistic to strychnia, for, as we have seen, the latter is distinctly tonic and stimulant of the nerve centres. I may mention its well-known powers as an aphrodisiac as one proof of this, while the former is just as powerful a depressant. If, then, Dr. Ratcliffe is right, when, in speaking of the treatment of epilepsy, he makes the following remark, "There is reason to believe that the therapeutics of convulsion must be based upon the notion that vital power has to be reinforced, and not upon the contrary opinion," does it not follow that, although the depressant effect of the bromides may keep the attacks of epilepsy in check, yet if we wish to cure our patients we must adopt measures to brace and tone the nervous system? and if this be granted, we shall find the most direct as well as the

most powerful agent which we can employ to effect this purpose is strychnia.

I have said in a previous paragraph that this remedy is in most cases more lastingly efficacious when given in small frequently repeated doses, and the doses must, in some cases, be very minute indeed, nor is it until I have by derivative treatment relieved the hypersensitive condition of the nerve centres of the medulla, that I attempt to give it at all in many cases. In short, we must at first stop short of producing its stimulant action, and use it only in slowly tonic proportions. In some cases when the attacks are very violent and frequent, the use of bromides is imperatively necessary, so as to give time for the adoption of a systematic tonic plan of treatment. In these cases I am in the habit of using considerable doses of the bromide of potassium, although I see that Dr. Hamilton prefers the same preparation of sodium, it being in his opinion more reliable and stable ; but so soon as I find that the lessening seizures give an opportunity for the adoption of derivative measures, I at once diminish or discontinue the bromides, and proceed with the opposite plan of treatment.

Use of
bromides
sometimes
imperative.

Of other remedies, I have but little experience and less faith. Dr. Bright thought highly of oxide and sulphate of zinc, and Dr. Watson says of this metal that "it appears to do good by

giving what is called tone to the nervous system, and rendering it less prone to be affected by the slighter exciting causes of the disease." I have given it, but without very satisfactory results, and having entire confidence in the tonic theory and practice, I have preferred to use the most powerful means at my disposal.

There is one class of exciting cause which I find to be remedied by the use of nitrate of silver in medium doses. This is when a peculiarly sensitive condition of the peripheræ of the gastric branches of the pneumogastric nerve exists. It is symptomatised by a constant pain after food, and extreme irritability of the stomach. I find that this is allayed by the nitrate of silver very readily. I have never exceeded grain doses, and I generally give from one-third to half a grain. Its action is probably to produce a deadening influence on the hypersensitive condition of the nerve. In the case of a young man in whom the whole mucous membrane, both of the mouth, pharynx, and stomach, displayed this extreme irritability, the result was excellent. In this case I gave the medicine on an almost empty stomach, contrary, I believe, to the usual practice.

Case XII

In summing up, then, what I have to say on the subject of the treatment of epilepsy, I will give a short resumé of the object and plan which not only seems to recommend itself to me as being in

accordance with sound physiological reasoning, but also because in my own and other hands it has proved eminently successful.

The point to which treatment is in the first place to be directed is to the improvement of the power of control of the nervous force. The next is to the equalisation of the distribution of nerve force throughout the whole of the nerve centres of the spinal system, and especially to the reduction of the sensitiveness and excitability of the medulla oblongata. It will be necessary, at the same time, to seek out and remedy any exciting causes. As will have been gathered from my remarks, I believe that the only plan of treatment which is at all likely to be followed with success is that of toning and strengthening the nervous system, and I think that the most effectual means of doing this will be found by using the most powerful nervine tonic with which we are acquainted, viz. strychnia, in combination with the various derivative plans which I have mentioned.

In treating of the exciting causes of epilepsy, I have alluded to some cases in which, without the existence of the first and most important of the two predisposing causes, a condition of what may be termed eccentric irritation may be sufficiently strong to overcome the natural power of restraint and force on convulsions, and that these convulsions may continue so long as the irritating causes

are in operation, and cease with their removal. These cases are, I believe, rare, and are usually produced by what may be termed mechanical causes of irritation. I have seen them due to spicula of bone forming on the meninges, to the presence of tapeworm, and, in one very interesting case, to the existence of a syphilitic node on the parietal bone. The case is so interesting that I shall give a short history of it here.

Case XIII. A young man of strong nervous constitution, and of temperate habits, had been for some years exposed to great heat in China and Japan. In March 1865 he was invalided home with an attack of congestion of the liver. Since that time until he came under my care in the following year he had been living at home, under medical treatment for enlargement of the liver, and using iodide of potassium internally, and iodine ointment locally. On May 22, a cold, snowy day, he imprudently stayed out all day fishing, and at dinner time that evening was seized with a violent epileptic attack; this was followed by others at the following intervals: May 25, three attacks, at intervals of one hour and a half. May 30, a fit in the evening. June 1, two fits, with six hours' interval. June 2, one fit in the evening. On June 8th he arrived in Malvern. He was a fine healthy-looking man, aged 29. Mentally he was considerably dulled by the frequent and severe

attacks. Soon after his arrival I was led to examine his head, when I found a spot the size of a florin over the right parietal bone, which was distinctly thickened and very tender. On inquiry I found that there was a vague and unsatisfactory history of syphilis, for which no specific treatment had been adopted. A free use of the iodide of potassium produced a rapid cure of the node, and also of the epilepsy, which has never returned. Now in this case the immediate cessation of the epileptic attacks on the removal of an exciting cause, convinced me that an unusually strong irritation had overpowered a naturally strong controlling power. An interesting fact in connection with this case was, that although the exciting cause was clearly situated on the right parietal bone, yet the patient previous to an attack always experienced an aura, which originated in the left hand and passed upwards towards the head. I may here again mention that I am much inclined to think that an aura is only present in those cases in which the controlling power is not altogether overcome, but still is able to make some resistance to the tendency of the nerve centres to discharge themselves.

CHAPTER IX.

CASES.

Effects of
bromides.

I PURPOSE, under this head, to give a few short notes of cases which seem to me to illustrate either variations in the nature of the symptoms, or the advantages of different modes of treatment. I have already mentioned those cases in which the use of bromides was found to be ineffective, if not positively injurious. I am constantly in the habit of hearing patients dilate on the depressing effects of this drug, and my experience of it would only induce me to use it in violently convulsive cases, and then only to gain time for the application of a tonic, as opposed to a depressant system. In certain cases, I am confident that the bromides not only do no good, but do positive injury. More especially I would point to those cases in which the disease has its origin in depressed vital conditions, as from exhaustion following great fatigue, either mental or physical, or after a depressing illness, fevers, etc. It is also seldom

applicable to cases of *petit mal*, and often tends to increase or prolong the mental confusion following such seizures. In a case of this nature now under my care, its effect has been certainly prejudicial, and a manifest improvement has at once attended the change to a tonic plan of treatment. In this case, Case XIII. the attacks, which occurred three or four times in the day, were accompanied by a very feeble circulation, cold hands and feet, and a constant sighing, due probably to a feeble heart's action. During the early part of the attack, the duration of which did not exceed two minutes, and was unaccompanied by any marked change of colour, the patient spoke incoherently, often merely "Dear me!" she then became for a few seconds perfectly unconscious, and sat with staring fixed eyes. The period of recovery was very rapid, and the attacks appeared individually to leave but little mental stupor, though the memory and general cerebral activity were a good deal dulled. My first effort in this case was continually directed to increasing the activity of the circulation, finding that diffusible stimuli produced an alleviation in the number and character of the attacks, I followed that plan by the use of small stimulant doses of the bimeconate of morphia, and with excellent effects, as the seizures decreased speedily to an average of less than one in the day, and their character has become greatly changed for the better. It is, however, upon

strychnia that I usually rely in endeavouring to induce a tonic change in the nervous constitution.

Case XIV. The first case in which I gave strychnia was that of a young man, aged 26, who consulted me early in 1860. He was unmarried, of spare habit, moderate liver, he had been subject to *petit mal* for about two years, but could assign no definite cause for the attack ; had lost flesh and strength considerably. A few days before I saw him he had been seized with an attack of a convulsive nature. He had no aura or other warning of his fit, nor could he refer to any particular pain in any part ; his heart's action was feeble, his appetite capricious, and he complained of great want of energy. I gave this patient 1-16th of a grain of strychnia twice daily in solution, and recommended for him cold bathing, etc. ; from this time he had no further attack, and his health rapidly improved : he continued the strychnia for about two months, when the attacks ceased, and with the exception of one slight tendency to relapse, which yielded readily to a return to the medicine, he has continued well ever since. This case, a very favourable one for any treatment, from its slight character and recent occurrence, presented no very prominent exciting cause, and, as you have seen, yielded to strychnia alone.

Case XV. In 1863 I saw a child, aged six, who was subject to a severe form of *petit mal* ; her health

was in all other respects good, but these attacks, which had come on soon after birth, were very peculiar ; they were frequent, occurring as often as six or seven times in the day. She would sometimes fall, at others merely lean against any neighbouring object. There was no convulsion beyond a mere stiffening of the right arm and hand, with inversion of the thumb. She had undergone a variety of treatment for three or four years—iron, valerian, iodide of potassium, etc. After taking strychnia, in doses of 1-24th of a grain, she rapidly recovered, and after a slight relapse the year following, has continued well since.

In the same year I was consulted about a Case XVI. young man, aged 26, who had been epileptic for six years : for the last two years he had been almost idiotic. In this case, the attacks were undoubtedly due to irritation of the sexual organs, from masturbation ; the attacks had very greatly weakened his nervous power ; he had partial paralysis of the bladder and tongue, and had been for some time in an asylum. In this case the effect of the strychnia was most marked ; the attacks gave way entirely, the paralysis of the bladder was removed, and that of the tongue partially so ; and the last I heard of him he was living at home, quite free from the fits, and much stronger as regards both mind and body.

Case XVII. A gentleman, aged 38, unmarried, a dull, heavy-looking man, has had epilepsy fourteen years, his attacks coming on, with a good deal of irregularity, once in a week or ten days. After first commencing strychnia in 1-12th of grain doses, his interval was ninety-six days, when an indiscretion in diet produced an attack which was not repeated. In this case it was difficult to assign an exciting cause: he was otherwise in good health, nor was there any sign of nervous irritation of any kind.

Case XVIII. A young gentleman, aged 20, had suffered for four years from epileptic attacks, at irregular intervals, these were attended with powerful convulsions; he was also in very delicate health. This patient took the 1-12th part of a grain of strychnia twice daily, under which treatment the attacks were reduced from an average of one in the fortnight (although the interval was sometimes two months) to one in four months. As he did not improve so rapidly as I could have wished in health, I recommended a sea voyage and a continuation of the strychnia; under this treatment he rapidly recovered, and has now been without an attack for three years.


Case XIX. A clerk, aged 22, unmarried, has led a very intemperate life; he has had delirium tremens more than once, and his heart's action is very irregular and feeble; the fits, which came on about once

in the week with considerable regularity, were mainly dependent on an irregular state of the circulation. In this case I found the combination of digitalis with the strychnia most useful, as he soon began to improve rapidly, and has now enjoyed perfect health for upwards of two years.

A gentleman, aged 19, has been suffering for Case XX. some years past from severe convulsive attacks ; he is also partially paraplegic ; cause—continued habits of onanism. In this case the attacks entirely yielded to a long-continued course of strychnia, and, what is very characteristic of the value of the drug in these cases, if he omitted a few doses he found his power decreased perceptibly. At the present date he has quite lost all symptoms of epilepsy.

In the following case the attacks were due to Case XXI. menstrual irregularity. A strong plethoric girl, aged 23, has had epileptic attacks at intervals of about a month. She had caught cold while menstruating four years previously, since which time she had suffered from the attacks. I here combined the strychnia with aloes and myrrh, and with great benefit. This patient is well.

A young man, aged 18, attacks of four years' Case XXII. duration, occurring every eight or ten days, but traceable to no especial irritation. This patient took strychnia in 1-12th of a grain doses for twelve months, at the end of which time, as he



had had no fit for four months, I discontinued it ; he is now entirely changed both in health and appearance, as he has quite lost the vacant expression, which had been very marked.

use XXIII. In August 1865 I saw a very interesting case of epilepsy : it was a very unfavourable one for treatment, as the attacks had come on during infancy, and had gradually increased in number up to the date at which I saw him, when he was 20 years of age. I will, however, give the notes of the case as furnished to me by Mr. Swinhoe, of New Swindon, under whose care the patient was.

" Thomas F., aged 20, first had convulsive attacks at the age of thirteen months, which have continued at intervals ever since ; he has never had less than two or three in the week. First seen by Mr. Tyrrell in August 1866, at which time he frequently had three fits in the day. He was ordered to take strychnia, which at first made him feel giddy, and twice a fit followed its administration, but by a little management and attention to the bowels it became tolerated, and he has taken it now in small doses for nearly six months. His present condition is as follows : the fits never occur oftener than once in the week, are now more like an attack of syncope than epilepsy. In all respects he is in much better health, and much more lively and cheerful. In fact, in this extremely unpromising


case, the strychnia has proved of the utmost benefit."—I do not remember the exact dose of strychnia which I prescribed for this patient, but I know it was a very small one ; as, from the history of the case, I rather dreaded its effect in any quantity ; it must also be remembered that my experience of the remedy was then comparatively small. The modification in the character of the attacks is also very curious, though by no means uncommon, and it is a change which I am always glad to recognise, as it almost invariably precedes an entire re-establishment of health.

In October last I saw a lady, aged 30, unmarried ; Case XXIV. has had epilepsy for eight years, the attacks coming on every week with tolerable regularity. Since commencing the strychnia (now seven months), she has had no attack, and I will read you a paragraph from a letter I received concerning her during the week. "I saw E. H. last week, and had a long talk with her ; she is most decidedly better, and I find has never had an attack since she took the strychnia, which she is still taking regularly. She is quite cheerful and much more active than she used to be." In this case I could trace no very positive indication of the exciting cause, and the credit of cure is here due to strychnia alone.

A not unhealthy-looking girl, aged 17, had never Case XXV. menstruated properly ; had been subject to epi-

lepsy for four years, the interval never being longer than one week ; the attacks varied in intensity, a slight one being sooner followed by others. In this case I commenced with one-sixteenth of a grain of strychnia twice daily, gradually carried up to the tenth, at the same time giving her aloes and myrrh and asafœtida in pills twice daily. In this case a perfect immunity from attacks commenced with the treatment, and has continued up to the present day. Although the menstrual irregularity has not entirely ceased, it is very much ameliorated. I used also in this case the cold affusion to the nape, coupling it at times with the application of warmth to the feet. This case, although not severe, is a type of a very prevalent form of the disorder, and shows how amenable such cases are to treatment.

Case XXVI. A fair girl, aged 14, partially paralysed on the left side. When two years old had what was called brain fever, during which she was insensible for a length of time ; recovered, but had a return about two years ago. Since the first attack she has been subject to continued attacks of *petit mal*, sometimes five or six in the day. She turns slightly to the right ; is slightly convulsed ; sometimes is partially conscious during them, and tries to talk ; sometimes she bites her tongue ; her manner is silly, being fond of repeating lines of poetry, for which her memory is good. She has



slight tenderness on pressure over the upper cervical vertebræ, and on percussing the atlas with the finger points, she complains of pain at the epigastrium. The attacks sometimes come on during sleep. I will give here an extract from the diary kept by the parents. The patient came under my care in May, and I prescribed for her: *R* Tinct. nucis vomicæ ʒiij., syr. aurantii ʒj. M., cap. ʒj. bis in die ex aquâ.

The following is the diary from May 29 up to the stoppage of the attacks:—

May 29th.—Four fits in the day; two in the night.

30th.—No fits in the day, but eight in the night, two of them being severe.

31st.—One fit in the morning; eight again at night, but less severe.

June 1st.—No fit in the day; four at night.

2d.—No fit in the day; five at night.

3d.—No fit in the day; four at night.

4th.—No fit in the day; three at night.

5th.—No fit in the day; three slight ones at night.

6th.—No fit in the day, and if any at night, very slight.

7th.—No fit in the day; only one observed at night.

8th.—No fits day or night.

9th.—No fits day or night.

10th.—No fit.

11th.—No fit.

12th.—No fit.

And so on. Since this date she has continued almost entirely free from attacks, but few having occurred, and those of an altered and much slighter character, which yield readily to a slightly increased dose of the strychnine.

Case
XXVII.

The following, which came under my care in June 1867, was one of the most severe cases of violently convulsive epilepsy I ever saw, and it is useful as showing the benefit with which considerable doses of strychnia may be given. To do this more effectually, I have drawn up two tables, the first showing the number of attacks during May, when the case was under no treatment of any kind ; the second giving the number during July, when he was using strychnia in the doses appended to the table. I may add that he ultimately recovered completely.

The attacks, which occurred almost exclusively at night, were most violently convulsive. They were much influenced by atmospheric changes, heavy thundery weather invariably increasing both their number and severity. Thus, July would, under ordinary circumstances, be his most unfavourable month. In addition to the strychnine, during part of the month he was using cold

affusion to the nape, and ice to the occiput during the night.

NO TREATMENT.

May 1, 1867 ... 2 fits.	May 17, 1867 ... 1 fit.
" 2, " ... 1 "	" 18, " ... 0 "
" 3, " ... 2 "	" 19, " ... 0 "
" 4, " ... 3 "	" 20, " ... 0 "
" 5, " ... 2 "	" 21, " ... 1 "
" 6, " ... 3 "	" 22, " ... 0 "
" 7, " ... 2 "	" 23, " ... 2 "
" 8, " ... 2 "	" 24, " ... 2 "
" 9, " ... 1 "	" 25, " ... 3 "
" 10, " ... 0 "	" 26, " ... 2 "
" 11, " ... 2 "	" 27, " ... 2 "
" 12, " ... 2 "	" 28, " ... 1 "
" 13, " ... 4 "	" 29, " ... 2 "
" 14, " ... 3 "	" 30, " ... 0 "
" 15, " ... 3 "	" 31, " ... 0 "
" 16, " ... 3 "	

UNDER STRYCHNINE.

Fits.	Fits.
July 1, 1867 0 $\frac{1}{8}$ gr.	July 16, 1867 3
" 2, " 1 very slight	" 17, " 0 $\frac{1}{8}$ gr.
" 3, " 1 { very slight,	" 18, " 0
no con.	" 19, " 0
" 4, " 0	" 20, " 0
" 5, " 0	" 21, " 0
" 6, " 0	" 22, " 0
" 7, " 1	" 23, " 0
" 8, " 2	" 24, " 0
" 9, " 0 $\frac{1}{8}$ gr.	" 25, " 0
" 10, " 0	" 26, " 0
" 11, " 0	" 27, " 1
" 12, " 0	" 28, " 1
" 13, " 0	" 29, " 0
" 14, " 1 $\frac{1}{16}$ gr.	" 30, " 0
" 15, " 0	" 31, " 0

On July 14, owing to a misunderstanding, he only had $\frac{1}{12}$ th of a grain instead of $\frac{1}{8}$ th. It will be seen that four fits followed in rapid succession. I think this table shows the power which strychnine possesses in restraining the epileptic attacks. I may add that, although so remarkably lessened in number, they were not at all increased in severity, but, on the contrary, were less convulsive. The above table gives the following results :—

MAY.		JULY.	
No. of attacks.	Nights free.	No. of attacks.	Nights free.
51	7	11	23

It will be observed that during the latter half of the month the dose of strychnine was as high as $\frac{1}{8}$ of a grain, taken twice daily, and this without its producing the slightest sign of excitement or irritation.

Case
XXVIII.

A girl aged 18, whose father suffered from melancholia, became epileptic at 13, in consequence of difficult and painful menstruation. The attacks, which were strongly convulsive, occurred at weekly intervals, but were more frequent and severe at the monthly period. Treated by cold sitz baths, rubbing, and small doses of strychnine, she has now been free from attacks for over two years, and her general health is quite restored.

Case XXIX.

A young man of 23 was seized with attacks of *le haut mal* while at school at the age of 15,

at which time I treated and completely relieved him for some three years by strychnine. On being seized with an attack of measles, he was again attacked, when a return to the same measures produced a similarly successful result, and he has now been quite convalescent for over two years.

A youth of the age of 16, whose father was Case XXX. a dipsomaniac, suffered from the age of ten with frequent attacks of *petit mal*, but which afterwards took on a more convulsive form. Having always been extremely nervous as a child, his mental power gradually deteriorated, so that it became almost impossible to teach him anything. Being placed under strychnine, in gradually increasing doses, and a tonic course of cold, coupled with an active friction of the spine and lower extremities, he gradually gained nerve power, and has now been free from attacks for three years. In addition to this, his mental capacity has materially strengthened.

His sister, who showed a similar deficiency of nervous control, being liable to violent outbursts of passion, and a condition amounting at times to hysterical mania, has been entirely relieved by a similar plan of treatment.

In many cases when epilepsy supervenes on the stoppage of a periodical flux, as loss of blood either by epistaxis or from hæmorrhoids, or when

the drying up of a skin disease such as eczema or psoriasis would seem to have been the exciting cause ; it will be advisable always to establish a safety valve in the shape of a seton or some other form of counter-irritation, before attempting to establish an increase of nervous power.

LXI. In a case where the disease followed the cessation of a periodical nose-bleeding, a seton, followed by a tonic and derivative system of treatment, proved perfectly successful, and I have seen equally good results ensue from the use of similar means in a case which arose on the stoppage of a hæmorrhoidal drain. In these cases there will, I think, be almost invariably found to be a marked increase of heat in the head prior to a seizure, coupled sometimes with redness of the conjunctiva, and these remarks will apply equally to cases in which the cessation of the attacks is followed by irritability of temper, which will in some cases almost amount to mania.

It would be easy to go on with the description of cases which have been benefited by this tonic system of treatment, but enough has been said to emphasise and illustrate my meaning. Indeed, throughout these pages I have, so far as possible, avoided prolixity, and have endeavoured to state my propositions in as few words, and with as little unnecessary reduplication, as possible. I will, however, here briefly recapitulate the points which

I have endeavoured, I hope not vainly, to prove.
They are :—

1st, That epilepsy is a disease of purely nervous origin.

2d, That it is essentially an outcome of nervous weakness and atony.

3d, That the only plan of treatment which is at all likely to be followed by permanently good results is a tonic system.

If the few words which I have here written shall induce others to follow up the path I have indicated, they will not have been written in vain.









